

4.1 Public perception of risk

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4.1.1 Introduction

As with any scientific domain, the field of risk perception also embraces many subfields and topics. These have been discussed in literature reviews that have sometimes focused on particular hazards, such as seismic hazards (Lindell and Perry, 2000), flood hazards (Kellens et al., 2012), genetically modified foods (Pin and Gutteling, 2008) or multiple hazards (Wachinger et al., 2013; Shreve et al. 2014).

Others have focused on theoretical frameworks such as people's protective action decisions (Mileti and Sorensen, 1990; Lindell and Perry, 2004; 2012), their information seeking (Griffin et al., 2004; Ter Huurne, 2008), how risk is culturally construed (e.g. Steg and Sievers, 2000; Engel et al., 2014) and socially amplified (Kasperson and Kasperson, 1996), or on specific psychological mechanisms such as the role of trust (e.g. Midden

and Huijts, 2009; Frewer et al., 2003; Haynes et al, 2008), perceived responsibility (e.g. Mulilis and Duval, 2003; Terpstra and Gutteling, 2008), fear and efficacy beliefs (e.g. Witte, 1994) and cognition and affect (Slovic et al., 2007; Loewenstein et al, 2001).

Understanding how people perceive risks is an important factor contributing to successful risk communication.

Understanding how people perceive risks is one important factor contributing to successful risk communication (e.g. Frewer, 2004; McComas, 2006; Slovic, 2000). However, this chapter is not an attempt to review the risk perception literature. Instead we focus on different approaches in risk communication and illustrate

the working of perceptual factors by presenting a number of topical cases. To set the ground, the Chapter 4.1.2 presents different approaches in risk communication. The presented cases comprise capacity building (Chapter 4.1.3), evacuation (Chapter 4.1.4), emergency alerts (Chapter 4.1.5), social media (Chapter 4.1.6) and news media (Chapter 4.1.7). Although some of these chapters focus on certain risks in particular, it is not so much the risk but rather the described socio-psychological processes that are relevant. We conclude with some general remarks (Chapter 4.1.8).

4.1.2 Approaches in risk communication

A long tradition in risk communication has relied on the idea that simply informing and educating lay people will increase their understanding and awareness of risk. This one-way information flow from expert to lay is often associated with the so-called

deficit model, as experts holding superior knowledge communicate to the less informed.

For a number of years a broad shift has been taking place throughout Europe (and beyond), characterised by, on the one side, ‘a right to know’, and on the other side by a stronger focus on ‘individual responsibility’ of citizens to be prepared for incidents and disasters. As a result, communicative activities that place responsibility for preparedness actions in the hands of citizens are gaining relevance (Wachinger et al., 2013; Walker et al., 2014; Begg et al., 2016). Many are now following a rather instrumentalist rationale intending to change behaviour or attitudes; others are rather concerned with norms and values that underpin, for example, established governance and decision-making structures. At the same time, risk communication can take place in a disengaged, one-way manner as well

as in a more engaged, two-way manner (Treurniet et al., 2015). Based on these two dimensions, four approaches of risk communication can be distinguished (based on Demeritt and Nobert, 2014; Wardman, 2008): risk message, risk dialogue, risk government and instrumentalist risk. These approaches can be seen as archetypes suggesting different ways to achieve one’s risk communication goals. In practice, examples of risk communication often contain features of multiple approaches (for more details see Kuhlicke et al., 2016).

model is based on the idea that responsible organisations are transparent about how they assess risks, what kind of outcomes risk assessments generate and how risks are managed. For instance, by designing risk maps in a way that renders them intuitively understandable, the sender tries to encode the message in such a manner as to increase the likelihood that the receiver will be able to decode the message and draw his or her own conclusion on what to do or not to do (Meyer et al., 2012).

4.1.2.1 Risk message approach

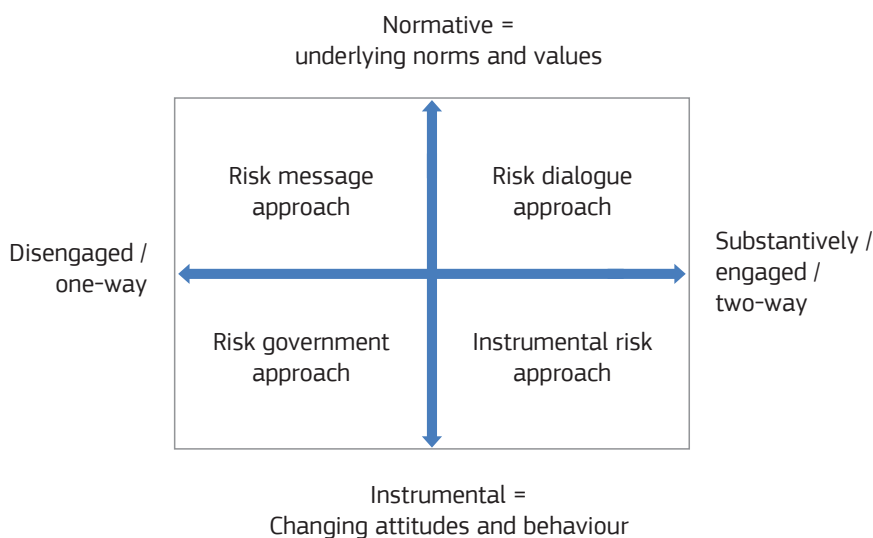
This type of risk communication is a one-way flow of information concerned with ‘transmitting risk information without distortion, bias or misunderstanding’ (Demeritt and Nobert, 2014). Fundamentally, this

4.1.2.2 Risk dialogue approach

In the risk dialogue approach the distinction between senders and recipients or between certified risk experts and the at-risk lay public is a blur. Exchange forms are based on the assumption that both have a say in the decision-making process. The design of participatory processes depends on its purpose. A common typology is to distinguish between a substantive and an instrumentalist rationale (Stirling, 2006). The substantive rationale usually aims at increasing the breadth and depth of knowledge that contributes to a decision, as participation allows for the inclusion of tacit or local knowledge that can improve the quality of risk assessments and risk maps, as well as of the management process itself (see Meyer et al., 2012). In the instrumentalist rationale, there is a stronger focus on building trust between actors and on raising awareness and motivation for taking actions to mitigate the impacts of hazards (see Wachinger et al., 2013). The relevance of dialogical forms of communication is also highlighted by many national and European legislations

FIGURE 4.1

Different approaches in risk communication.
Source: Based on Wardman (2008) and Demeritt and Nobert (2014)



(Höppner et al., 2010).

Many communicative activities are nowadays intending to change behaviour; others are concerned with norms and values. In addition, risk communication can take place in a disengaged (one-way) and in a more engaged (two-way) manner.

4.1.2.3 Risk government approach

Communication within the risk government approach aims at changing attitudes and behaviours, but it does so in a less instrumentalist and explicitly persuasive manner compared to the instrumentalist risk approach. While the latter is opaque about its intention, the government model relies on ‘... logics of individual choice and self-discipline, rather than explaining new norms of conduct as being imposed from above through coercion’ (Demeritt and Nobert, 2014).

In many European countries insurance companies, for instance, offer more affordable insurance premiums if clients voluntarily participate in regular preventive medical check-ups and, by doing so, aim at activating individuals’ personal risk awareness and inviting them to consider the negative consequences of smoking or of excessive lifestyle choices; thus cre-

ating awareness of their own choices and decisions and the negative consequences these might have on their lives.

4.1.2.4 Instrumentalist risk approach

The instrumentalist risk approach aims at actively changing people’s behaviour and pays close attention to the ‘interactions between information, attitudes and behaviour’ (Demeritt and Nobert, 2014). Due to the increasing prominence of this model, many empirical studies focus on understanding the factors that motivate individuals to take responsibility and action in order to increase their preparedness (Shreve et al., 2014). This type of communication may take many different forms. Quite common are the use of printed booklets or brochures that encourage residents at risk to increase their preparedness. The EU project Tactic has collected a multitude of such examples, which can be accessed through the online platform (TACTIC project, 2017). Also more formalised ways of trying to change people’s habits are increasingly established. For instance, in the German state of Saxony citizens are required by law to take precautionary actions to increase their preparedness (Ueberham et al., 2016).

4.1.3 Capacity building through one-way risk communication

The EU Seveso and Floods Directives have made public risk communication an obligatory task of risk manage-

ment in EU countries. Government websites, dedicated hazard and risk maps and brochures are common methods to inform the general public about risk and possible ways to increase their preparedness. These methods provide information about risks in a non-dialogic fashion and can be seen as examples of the ‘risk message approach’. Transmitting risk information without distortion, bias or misunderstanding is a challenge, however, both from a normative and a practical perspective.

From a normative perspective, ‘without distortion, bias or misunderstanding’ does not mean that the content and tone of the risk communication is ‘value free’. Senders of risk messages, either risk experts or policy-makers, have their own perceptions of the problem and interests. These are informed by societal norms, political agendas and personal opinions — which are hardly ever universally shared in society. In addition, providing information that is to be understood by many people with different backgrounds often requires focusing on the most ‘important’ (i.e. certain) aspects and simplification of information. This results in deliberate and chance choices in content (wording and images) and tone, which in turn influences people’s perceptions and attitudes in different gradations (also see Chapter 4.1.5).

From a practical perspective, ‘transmitting risk information’ is hardly ever an objective on its own. A common complementary objective of providing information is to enhance risk awareness and to provide information about individual preparedness actions. This reflects a cross-over be-

tween risk message and risk government approaches. The goal is usually to convey a message drafted by a responsible organisation to those who are 'supposed to need' this message in order to be better prepared for disasters.

While such measures have a relatively low cost (Lundgren and McMakin, 2013) and are in many cases essential for getting a certain message across (e.g. warning), non-dialogic risk communication on its own seems limited in its impact on most people's attitudes, active engagement and preparedness behaviour (Moser, 2010). The reason is that changes in attitudes and behaviour are the end result of a complex social-psychological process, and the route to this end result differs greatly between people and communities. Risk communication from authorities will not lead to protective action decision-making unless people receive, heed and comprehend the socially transmitted risk information (Lindell and Perry, 2004). For people to act upon a risk message they must perceive its relevance as well as a sense of urgency. What is relevant or urgent for one person may not be so for others. For instance, changing the battery of a smoke detector may be linked to a personality trait (e.g. high risk aversion or a prevention orientation; e.g. De Boer et al., 2014), previous experience with fire risk, willingness to adhere to a perceived social norm (e.g. "I should have a working smoke detector") or because of practical circumstances (e.g. being a smoker). However, even with these factors present, one may fail to take action. For instance, dealing with risk may arouse negative affect in people, which may in turn result in attempts

to control their feelings instead of taking action (e.g. denial), as one may feel unable to perform required actions (low self-efficacy), have little faith in the protective action itself or action is hampered due to practical response barriers (e.g. having other priorities).

Evaluations of a campaign about communicating flood risk, organised by the city of Zurich, showed that one-way risk communication can improve flood preparedness to some extent; i.e. home owners' flood awareness and their intentions to implement protective actions did increase (Maidl and Buchecker, 2015).

There is no such thing as 'one size fits all' in risk communication. Resilient behaviour is more likely when there is a mix of communicative approaches and other types of measures in place. Risk communication is based on a thorough understanding of risk perceptions and capacities that are shaped through the historical and local context.

The majority of respondents felt better informed after the information campaign (only 17 % reported that the campaign did not increase their knowledge) and regression analyses revealed that the perceived useful-

ness of the material provided had the strongest effects on flood preparedness intentions. A perceived need for information had greater effects on preparedness intentions than risk awareness itself, underlining that the motivation to do something increased through the information campaign. However, since the overall effect of the information campaign was rather low, the authors argued that a single-event campaign is unlikely to have profoundly positive effects on preparedness behaviour and therefore needs to be embedded in a long-term risk communication campaign.

Empirical studies also indicate that it is not so much the information itself that is of relevance but rather the wider context within which such information is communicated. Engel et al. (2014), for instance, focus on the role of disaster subculture as a way to explain how two neighbouring communities have developed different strategies and practices to deal with flood events. These subcultures featured differences in beliefs, knowledge, symbols and preparedness and response patterns. Their findings suggest risk communication would require different approaches in both communities.

Therefore, what is feasible and effective in one context may be difficult or ineffective somewhere else. There is no such thing as 'one size fits all' in risk communication. Resilient behaviour is more likely when there is a mix of communicative approaches and other types of measures in place based on a thorough understanding of risk perceptions and capacities that are shaped through the historical and local context. Finding the right mix of measures is therefore a challenge.

4.1.4 Developing flood evacuation strategies through dialogue

In an attempt to hit the right note in risk communication, this paragraph presents a case study that tested effects of different risk communication storylines on citizens' flood evacuation intentions in the city of Dordrecht (Terpstra and Vreugdenhil, 2015). Dordrecht is located on an island in the Dutch river delta. A potentially dangerous situation occurs when high river discharges result in high water levels that are suddenly further increased by a storm surge pushing sea water into the river delta. Evacuation models indicate that in such a case only between 10-20 % of the population will be able to leave the city before the levees break. When they do, water depths may vary between 2-5 metres and the best chance of survival is to seek shelter in homes on a higher floor or in a high building in the neighbourhood. To reduce the potential number of casualties, the authorities aim to develop and communicate a strategy based on sheltering at home or in a public building.

In 2015 the municipality started a risk dialogue by involving citizens in focus groups to understand their flood perceptions, their evacuation attitudes and their concerns and suggestions. To gain further insight into the level of support for 'staying at home' or 'going to a public shelter', a questionnaire survey was performed. The questions asked were embedded in two different storylines, which re-

flected two different communication frames that emerged from previously held focus groups. 'Framing' in communication refers to the systematic use of words and symbols reflecting underlying norms and values. For a risk dialogue it is important that people are able to relate to the norms and values and support the frame that is used. Framing can also be regarded as a form of nudging. Nudging refers to '...any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any option or significantly changing their economic incentives.' (Thaler, Sunstein, 2009). A more pessimistic 'Self-frame' emphasised that in case of a flood, people are on their own for a few days and food, water and utilities are unavailable and they eventually have to evacuate from the flooded area on their own.

Cognitive (beliefs) and affective (feelings) factors are important predictors of attitudes. These are influenced by the way risk information is framed in communication messages.

The more optimistic 'Together-frame' emphasised the community perspective meaning that people are in it together and will try to help each other, and authorities will assist in evacuation where needed and arrange basic stocks of food, water and utilities in shelters. All respondents (about 625 citizens) answered questions related

to their efficacy beliefs, feelings and support for two evacuation options (staying at home, going to a public shelter) and their current evacuation intentions. More questions were asked, but for our purposes we will discuss this subset. On a 1-10 scale, both strategies received higher rates in the Together-frame—i.e. staying at home (Self-frame: 6.2 vs. Together-frame: 6.3) and going to a public shelter (Self-frame: 5.2 vs. Together-frame: 6.0). Remarkable, however, is the fact that both strategies were rejected by a substantial number of respondents: about 27-28 % rejected staying at home while 36-52 % rejected going to a shelter (upper limit % reflects rejection in the Self-frame).

To further explain these results, the authors evaluated respondents' efficacy beliefs and fear-related feelings. Efficacy beliefs reflect the extent to which a person believes a protective action is effective in the protection of people and/or property (e.g. Lindell and Perry, 2004, 2012). Fear-related feelings such as dread is a negative affective state. Affective states influence people's judgements (Loewenstein et al., 2001; Slovic et al., 2007) and can be unlocked by framing information (Terpstra et al., 2014). For instance, Finucane et al. (2000) performed framing experiments to influence perceived risks and benefits of nuclear power, natural gas and food preservatives. Their experiments showed that when information portrayed the benefits as high (or risks as low), the subsequent experience of positive affect caused subjects to perceive risks of nuclear technology as low (or benefits as high). Conversely, when risks were framed as high (or benefits as low), the subsequent experience of negative affect caused subjects to perceive

benefits of nuclear technology as low (or risks as high).

In line with experiments of Finucane et al., additional analyses of the Dutch flood risk data showed that respondents held more favourable attitudes in the more optimistic Together-frame since this frame resulted in lower negative affect/fear and higher efficacy beliefs. Specifically, staying at home received a (marginally) higher score in the Together-frame because it evoked slightly lower levels of negative affect/fear. Going to a public shelter received a higher score in the Together-frame because this frame evoked lower levels of negative affect/fear and higher trust in the efficacy ('being safe') of a public shelter.

Respondents' intentions also revealed an interesting pattern. Staying at

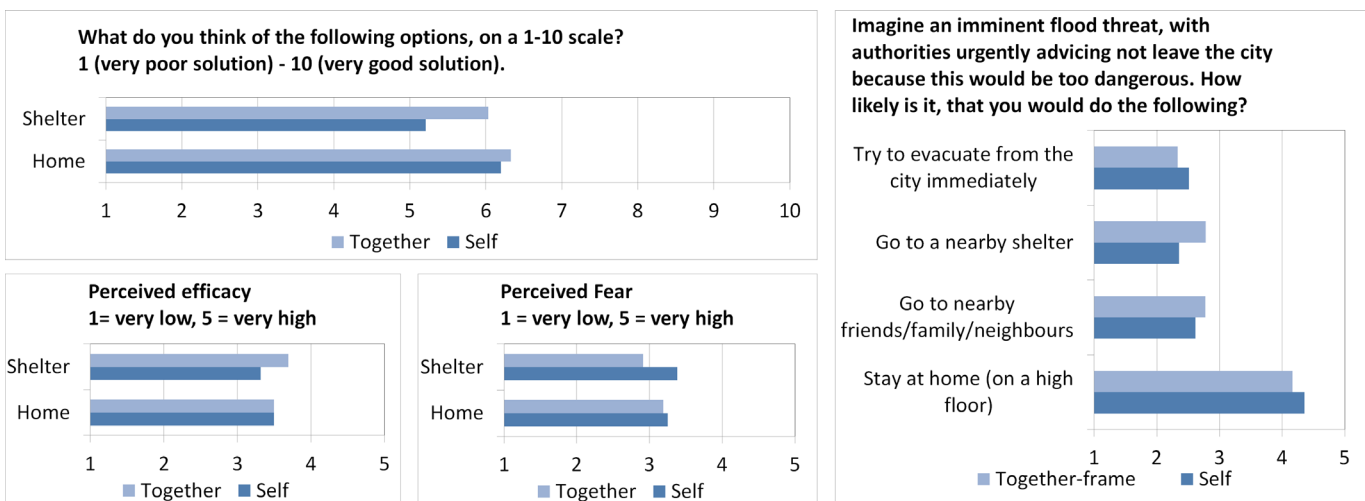
home was regarded as likely by about 88 % of the respondents, while going to a nearby shelter or going to family, friends or neighbours was regarded as likely by a substantially smaller number of people (25 % and 28 %, respectively). So even though attitudes towards staying at home and going to a public shelter are similar (at least in the Together-frame), the majority preferred to stay at home. Finally, the fact that 19 % of the respondents considered leaving the city, even though the authorities urge them not to, is remarkable. These people may unnecessarily risk their lives. Their intention to flee the city is correlated with their attitude towards staying at home or going to a public building. That is, respondents who hold less favourable attitudes towards staying at home or going to a shelter are more likely to flee the city in case of an urgent flood

threat.

Overall, the meagre level of support for staying at home or going to a public shelter suggests that these strategies can be further detailed. A clear action plan on how citizens are supported prior to a flood (e.g. food and water supply and setup and arrangements in shelters) and afterwards (e.g. a rescue plan) is an important starting point. Based on a further risk dialogue with citizens, experts in flood risk management, utilities, medical and rescue services, it seems that such a plan can be developed. In addition, developing a positive yet realistic storyline for risk communication based on the capacities available in the local communities (e.g. neighbourhoods) can help to gain further support among citizens and reduce chances that people risk their lives by fleeing the city while the

FIGURE 4.2

Perceived fear, efficacy, support and intentions regarding flood evacuation.
Source: Terpstra and Vreugdenhil (2015).



levees are about to break.

4.1.5 Facilitating public response through wireless emergency alerts

In the case of an imminent threat, authorities require communication channels that deliver warnings accurately and quickly to a potentially large number of people. A relatively new development is the so-called Wireless Emergency Alerts (WEA). Several countries have started sending out WEA to mobile phones and other devices aiming to alert people at risk and help them to react adequately (Gutteling et al., 2014). As one-way communication tools, WEA are an example of the risk government model. Many of these systems are based on the mobile phone broadcast technology. There is no need to have Wi-Fi or internet or to subscribe to the service. However, technological development and its implementation has outpaced studies on the effectiveness and limitations (Bean et al., 2015). To date, only a few studies have evaluated mobile device-delivered warning messages (Sutton et al., 2014; Terpstra et al., 2012).

A United States report lists several general insights necessary to facilitate adequate public reactions to WEA, among which: (1) effects should be studied after real events, not in hypothetical situations; (2) people need to be trained to properly understand the warning system; (3) the alert needs to attract attention; (4) people seek social confirmation of a warning message before taking protective action;

and (5) warnings must contain information that is important to the public (Committee on Public Response, 2013). This chapter describes a recent Dutch study on the public's reactions, which is partly based on these general insights.

In the study people were questioned some time after the implementation of the WEA system in real local emergency situations in three Dutch cities. In the first two cases the emergencies were large fires in non-residential industrial areas with a release of potentially hazardous smoke and soot particles to nearby residential areas. The third situation was a large fire in a historic city centre, causing one casualty. Randomly selected mobile and land-line phone numbers of people living in the broadcast area were dialled by trained agency interviewers, asking whether they had received the WEA. In the Netherlands the WEA system is known as NL-Alert. If they had, some additional questions were asked (e.g. their self-reported behaviour) and people were invited to complete an additional online questionnaire measuring psychological and behavioural determinants derived from conceptual models on risk communication (Witte and Allen, 2000; Floyd et al., 2000; Lindell and Perry, 2012).

These models suggest that receivers of warning messages first assess the threat level, creating some level of personal urgency, and subsequently assess their ability to personally cope with the emergency situation. Coping appraisal is related to one's belief to be able to perform the recommended behaviour and one's belief in the adequacy of the provided advice.

When the threat is seen as personally relevant, and the coping appraisal is positive then one will decide to execute the recommended adaptive behaviour. However, when the threat is seen as relevant but coping is seen as impossible, some psychological reframing of the situation (e.g. psychological denial or defensive behavioural avoidance) is a likely reaction. In recent years, studies have shown that in emergency situations the individual is an information seeker but also an information source for others. Existing research suggests that perceived information sufficiency — that is, to which level one is satisfied with one's information position — predicts additional information seeking and information sharing. Also, the perceived quality of the warning message is an important indicator of its effectiveness (Renn and Levine, 1991; Earle, 2010).

Wireless emergency alerts (WEA) are a relatively new method to deliver warnings to a potentially large number of people.

Looking in more detail at the public's reactions to receiving the WEA, some findings are noteworthy. An example of the WEA is this message that was sent to inhabitants:

NL-Alert 20-01-2013 14.50 Setheweg Meppel. Major fire. Keep clear of the smoke!

Close windows and doors. Turn off ventilation. New message follows.

The structure of all Dutch WEAs is similar: sender (NL-Alert date and time), threat (major fire), location (Setheweg Meppel) and advice (*Keep clear of the smoke! Close windows and doors. Turn off ventilation. New message follows*). The respondents' reactions were measured on five-point scales (see Table 4.1).

Overall, the scores indicate that the emergencies had relatively little personal impact for most participants. However, even in these relatively low impact situations, there are some noteworthy findings. On average, respondents valued their coping abilities as relatively high and clearly indicated that the included message components (sender, threat, location and advice) were regarded as clear, complete and reliable (message quality). In addition, respondents did not perceive high expectations to be knowledgeable and responsible with regard to their behaviour in these situations (social norms). In absolute terms,

perceived fear and perceived threat were not high, although they were somewhat higher in the Leeuwarden case. This seems reasonable since the Meppel and Oisterwijk fires occurred at some distance from residential areas, while the fire in Leeuwarden took place in the historic city centre. In addition, compared to the Meppel and Oisterwijk cases, respondents from Leeuwarden were somewhat less satisfied with the information received and reported more avoidance (i.e. to continue with what one was doing) and less adaptive behaviour (i.e. to comply with the advice and seek and share information). Two alternative explanations come to mind. First, emergency services in Leeuwarden failed to describe the location of the fire, which may have caused lower levels of satisfaction with the information provided, and they did not mention any personal threat, which resulted in higher disinterest in the situation. Second, higher levels of perceived threat and fear may have

caused stronger fear control responses, resulting in more avoidance reactions and less adaptive behaviour. Even though the sample was small and these incidents had relatively little personal impact, correlations did provide some support for these explanations. Adaptive behaviour was predicted by higher perceived fear, seeking social confirmation and perceived warning quality. Stronger avoidance was predicted by higher levels of perceived risk, fear and higher perceived expectations from one's social environment. Overall, the study presents a favourable impression of the public's evaluation of the WEA system; however, more research is needed with other types of emergency situations to fully understand the psychological, behavioural and communicative reactions of receivers.

TABLE 4.1

Mean (standard deviation) for the measured determinants after three WEA cases.
Source: Gutteling et al. (2014)

	Case 1 (Meppel)	Case 2 (Oisterwijk)	Case 3 (Leeuwarden)
N=	175	181	287
Self-reported Behaviour			
Adaptive a)	1.71 (0.26)	1.69 (0.29)	1.55 (0.29)
Avoidance b)	1.17 (0.38)	1.12 (0.33)	1.46 (0.50)
Perceived social norms c)	2.37 (1.10)	2.30 (1.03)	2.13 (0.99)
Efficacy beliefs c)	3.93 (0.93)	3.90 (1.06)	3.97 (1.04)
Perceived threat c)	2.41 (0.82)	2.59 (0.86)	2.90 (0.82)
Perceived fear c)	1.72 (0.62)	1.69 (0.57)	2.32 (0.69)
Perceived message quality c)	4.31 (0.77)	4.37 (0.75)	4.32 (0.81) e)
Perceived information sufficiency d)	3.59 (1.11)	3.63 (1.11)	2.98 (0.82)

4.1.6 Effects of interaction on social media in emergencies

Social media (Twitter, Facebook, blogs, etc.) have been under the attention of risk and disaster managers longer than WEA. Social media and WEA provide similar possibilities to inform the public of imminent emergencies. However, social media also allow for feedback in the form of user-generated content (opinions, observations, etc.) or geospatial information (Palen et al., 2009; Terpstra et al., 2012; Feldman et al., 2016; Houston et al., 2014; Committee on Pub-

lic Response to Alerts and Warnings using Social Media, 2013; and many others). This chapter aims to describe studies on the effectiveness of social media in emergencies. The use of social media with the objective to influence people's behaviour is therefore an example of the instrumentalist risk approach.

As with WEA, there are few empirical studies indicating at a general level what the impact of social media disaster information is or how social media can be designed to be effective disaster-warning tools. The number of studies that have analysed social media messages after real incidents and disasters is steadily growing. A United States study analysing the use of Twitter after a disaster (the Tennessee

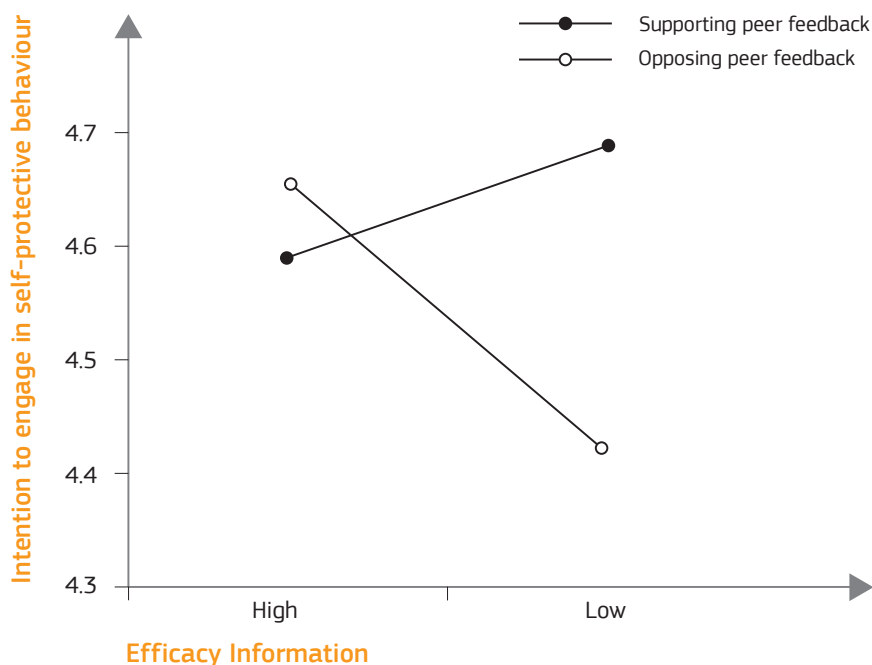
River dam break) indicated that the amount of information shared by citizens — even those not in the direct vicinity of the emergency location — is considerably greater than the 'official' information from governmental organisations and the company (Sutton, 2010).

Social media are intensively used in times of crises to share information and support or oppose opinions. A recent study indicates that when official information is regarded as effective, peer feedback is less influential.

FIGURE 4.3

Interaction effect between efficacy beliefs and peer feedback on the intention to engage in self-protective behaviour.

Source: Verroen et al. (2013)



Twitter users also tended to be critical toward the official information and corrected wrong information. Starbird and Palen (2010) studied Twitter messages after the Red River flood of 1997 and the the Oklahoma wildfires and found that Twitter messages from those directly involved in the situation are retweeted relatively often. Information provided by local news media are also retweeted relatively often. A Dutch study analysed Twitter messages just before, during and immediately after a huge storm which hit a large public open air music event (Terpstra et al, 2012). In the Twitter messages, weather predictions were found as well as rumours and messages that were focusing on providing help after the emergency. When the scale of the emergency became evident, one per-

son took the initiative to organise the inhabitants of a nearby town to provide help (places to spend the night, food and drink, showers, clothing, Wi-Fi, etc.). The data suggested that some of the Good Samaritans were Twitter novices.

An important downside of analysing communication after real events is the difficulty in analysing cause–effect relations of communication messages. This requires communication experiments in a controlled setting where researchers can manipulate perceptual factors by providing different information to separate groups and compare their responses. Although such studies are quite common in communication research, applications to social media are scarce.

Verroen et al. (2013) focused on a typical characteristic of social media communication: people’s positive and negative feedback on an earlier distributed message. The message contained emergency information in the context of a high-impact risk, namely the derailment of a freight train carrying a highly flammable and toxic substance. These authors were interested in the interplay of the perceived efficacy of the emergency information and peer feedback, such as responses on social network sites (e.g. Twitter) and the effect of this interplay on the intention to engage in self-protective behaviour.

The study pitted high- and low-efficacy information messages against supporting (positive) and opposing (negative) peer feedback (N =242). Although the study used a hypothetical emergency situation, the participants were selected based on the fact that they lived in an area close to an

existing railroad track used by these high-risk trains. Results showed a significant interaction effect between efficacy information in a news article and peer feedback from Twitter messages on both the intention to engage in self-protective behaviour (see Figure 4.2) and the levels of involvement.

Participants who received the news article with more efficacy information were similarly influenced by supporting or opposing peer feedback via Twitter messages.

However, among those who received a low efficacious news article, the effect of peer feedback on these two variables was significantly stronger. Supporting peer feedback (that is peer feedback that supported the advice in the news article) resulted in a significantly higher intention to take protective measures (and involvement) than opposing peer feedback (that is feedback that questioned the advice in the news article). Apparently, when in doubt about how to act to mitigate risk, the tone of peer feedback on social media is important for one’s decision making.

4.1.7 Role of news media in defining human responses to crises

In this final case we discuss the role of the news media. This case is not an example of one of the four risk communication approaches in particular. Rather that news media can be regarded as a (highly) influencing factor in each of these approaches, as they reflect on the norms, values and

behaviour of people and organisations in relation to risks, incidents and crises. People may be influenced not only by how information about the actual risks is framed, but also by how different frames concerning reactions and behaviours to risks and dangers are put forward in media articles and reports after critical events. The role of media in contributing to erroneous beliefs and myths about human behaviour in stressful situations has been discussed for some decades in the social science literature, culminating in a number of critical analyses of the reporting of reactions to Hurricane Katrina in 2005 (Tierney et al, 2006). More recent work has further demonstrated how subtle and implicit framing can define the portrayal of human reactions, potentially influencing the expectations and evaluations of both the public in general and risk and crisis professionals in particular. In an analysis of media reporting from six different crisis events affecting Swedish society, including natural disasters, antagonistic threats and diffuse threats, Nilsson et al. (2016) identified three dynamic interrelated processes simultaneously at work in framing public reactions.

The first process, that of identification, concerned individuals and groups that were referred to as affected, and in what context. For example, in the natural disaster events, some groups were described as vulnerable and affected by serious losses in terms of economic value of forestry, while others with less tangible losses were barely mentioned. The second process refers to characterisation of how different individuals and groups reacted and coped with the situation. In this process certain characteristics

tended to be attributed collectively to groups among the public, creating ingroups and outgroups. This pattern was particularly evident in the case of antagonistic events (one case concerned street shootings in a major city), separating the fear reactions of law-abiding citizens from those of victimised groups with suggested criminal links.

News media reports play a very important role in effective communication and support public needs in stressful situations.

Finally, evaluation processes that provided signals could be identified, sometimes quite subtle, as to which reactions and behaviours could be considered as expected, accepted or stigmatised. For example, the choice of certain words or references could suggest that individuals are either reacting logically, are not reacting sufficiently responsibly or are overreacting. Such suggestions indirectly communicate expectations and evaluations of correct or incorrect behaviour. Thus, for example in the case of the influenza A (H1N1) pandemic and the issue of vaccination, quite subtle semantics could reflect evaluations of who reacted sensibly (and got vaccinated) and who did not. Interestingly, these evaluations were somewhat reversed when cases of narcolepsy were linked to the vaccination campaign, leading to a new and somewhat different media debate (Scott and Enander, 2016). Taken together, these find-

ings demonstrate a need to examine critically frames which may distort a realistic view of public needs and reactions when faced with risks, thus leading to ineffective communication and support.

4.1.8 Conclusions and key messages

In this chapter we presented different approaches to risk communication and acceptance of risk communication and addressed a number of socio-psychological concepts that have been shown to influence people's perceptions, attitudes and behaviour in the face of a wide variety of risks. Based on the pillars of the Disaster Risk Management Knowledge Centre, we conclude with the following three key messages.

Partnership

For a number of years now, a broad shift has been taking place throughout Europe (and beyond), characterised on one side by 'a right to know' and on the other side by a stronger focus on 'individual responsibility' of citizens to be prepared for incidents and disasters. Risk communication that is based on one-way media campaigns alone, telling people how to prepare, is hardly effective. In terms of partnerships, engaging in a dialogue with local communities to understand the historical and local contexts is an important basis for future risk communication that focuses on stimulating resilient behaviour.

Knowledge

Sound knowledge of the effects of

communication messages based on communication experiments and tests is indispensable for delivering effective communication. In addition, there are many best practices available that have been identified by EU projects, such as Tactic and CapHazNet, that may offer inspiration.

Innovation

In some cases a more fundamental approach may be needed to set up and monitor communication effects and improve communication practice. This is especially important where it concerns innovative methods such as the use of new communication tools (e.g. WEA), complex topics (e.g. flood evacuation strategies), activities that cause great societal unrest (e.g. CO₂ storage) or where norms and values are at stake (e.g. stigmatisation in media reports). In such cases, profound insight from communication research can be useful to support further decision-making.