Chapter 5

Fear-Mongering or Fact-Driven?
Illuminating the Interplay of Objective Risk and Emotion-Evoking Form in the Response to Epidemic News

A shorter version of this chapter is currently under review for publication in *Journal of Health Communication* as: Klemm, C., Hartmann, T., & Das, E. (under review). Fear-mongering or fact-driven? Illuminating the interplay of objective risk and emotion-evoking form in the response to epidemic news.
Abstract

This study examined the veracity of the common assumption that news coverage of epidemic outbreaks spawns heightened fears and risk perceptions. An online experiment with 1324 participants from a representative sample investigated the interplay of the form of news coverage (factual vs. emotion-laden) and key aspects of objective risk (low vs. high vulnerability, low vs. high severity) on audience responses. Participants were presented with 1 of 8 versions of a newspaper article followed by measures on risk perceptions, negative affect, empathy, behavioural intentions, and perceived sensationalism. Risk perceptions and fear were primarily driven by objective risk characteristics, whereas emotion-laden news form only increased perceptions of disease severity, not of fear or personal vulnerability. Results further revealed a counteracting effect in the reception of emotion-laden news: individuals judged an emotion-laden article as more sensational, which in turn lessened responses like fear and risk perceptions, however, dependent on severity and vulnerability.
Infectious disease outbreaks have plagued mankind throughout history. News media play a key role in informing the public, yet a primary criticism is that they may actually aggravate the impact of such outbreaks by intensifying fears and increasing risk perceptions. This criticism centres around the common assumption of an overly emotion-laden nature of news reporting, as in sensationalist news, which may trigger unwarranted fears and exaggerated risk perceptions (Dunwoody & Peters, 1992; Shuchman & Wilkes, 1997), perceptions evoked by an emotional portrayal of risk but unjustified given objective risk. These perceptions may, in turn, trigger irrational responses (Yusuf, Yahaya, & Qabli, 2015).

The conclusions of a survey of news consumption during the recent Ebola epidemic and public concern about a potential outbreak in the U.S. (New Jersey) by the Rutgers-Eagleton Poll exemplifies such criticism, when stating: “The tone of the coverage seems to be increasing fear while not improving understanding” (Eagleton Institute of Politics, 2014, p. 3). Existing empirical evidence from journalism and media effects research provide indirect support for this common belief (e.g., Aust & Zillmann, 1996; Grabe, Lang, & Zhao, 2003; Zillmann, 2006) but direct evidence – particularly for the case of epidemics – is missing. Furthermore, a central question that has remained unanswered is what exactly drives heightened risk perceptions and fear: emotion-laden reporting, or real-world events, i.e., the objective risk characteristics, themselves?

The present research aims to answer this question through systematically investigating the independent and combined effects of different types of risk characteristics (low vs. high vulnerability to risk, and low vs. high severity), and the style or form of the news article (factual and emotional), when covering the same risk story. The present study moves beyond existing literature in three important ways. First, prior research investigated the impact of either only severity information (Gibson & Zillmann, 1994), only the emotionality of risk portrayal (Gibson & Zillmann, 2000; Zillmann, Gibson, & Sargent, 1999), or of a joint manipulation of severity and vulnerability (Zillmann et al., 1999). The present study is the first experiment to examine the independent and combined effects of these central factors systematically. Second, only few studies investigated the impact of content, such as risk information, and formal features on the perception of an issue separately, comparing either different types of risks (e.g., food poisoning vs.
handgun violence; Aust & Zillmann, 1996), or risk to non-risk stories (e.g., tornado vs. layoffs at a big corporation; Grabe et al., 2003). In contrast, the present study investigates the impact of content and form of a story covering the same type of risk, systematically varied in key characteristics.

Third, the present study aims to reconcile seemingly conflicting findings in previous studies with regard to the specific effects of emotional news. While it has been proposed and found that emotional news aggravates risk perceptions and negative affect, other researchers have proposed that audiences react with increased scepticism or a critical attitude to emotion-laden news, which may diminish perceived risk and negative affect (Grabe, Zhou, Lang, & Bolls, 2000). Existing findings on this issue are inconsistent, however, as at least two studies indicate, emotion-evoking formal features may decrease ratings of believability and objectivity (Grabe et al., 2003, 2000). These findings create a paradox that has remained unresolved, namely how the fact that emotional news heighten risk perceptions and fear can go hand in hand with the observed ability of audiences to recognize and resultantly distrust overly emotion-evoking news. In other words, why should people fear something they do not believe? To address this paradox, the present study tests both effects simultaneously through a mediation analysis. In addition, prior studies were conducted predominantly on samples of U.S. students in laboratory or classroom settings. Our approach also adds methodologically to existing research by presenting a large-scale study on a representative sample in a close to real-life setting.

Objective Risk Characteristics and (Emotion-Laden) News Portrayal: Impact on Audience Responses

Communicating risk is challenging, as lay perceptions of risk are barely driven by technical, objectifiable risk characteristics (magnitude and likelihood) but are shaped by a complex interplay of technical characteristics with various other factors, such as voluntariness, controllability, familiarity, and catastrophic potential (Slovic, 1987). Predicting individuals’ responses to risk information can thus be a difficult undertaking. Yet, existing research
on health and risk communication shows at least two things about the way individuals respond to risk messages clearly: (1) different risk characteristics, i.e., severity and vulnerability, have different impact on audience responses, thus rendering it important for research to distinguish the effects of both, and (2) objective risk characteristics themselves inevitably evoke emotion.

With regards to the first point, socio-cognitive models from the field of health communication, such as Witte’s Extended Parallel Process Model (EPPM), commonly discriminate two distinct threat components that influence individual’s response to risk: perceived severity (i.e., seriousness or magnitude of a risk) and perceived vulnerability (i.e., likelihood of being affected by a risk). These have been recurrently found to affect risk perceptions, health intentions, and behavioural responses differently (Das, de Wit, & Stroebe, 2003; Das, 2011; De Hoog, Stroebe, & de Wit, 2007; Keer, van den Putte, & Neijens, 2010; Witte & Allen, 2000). Although several models have proposed that severity and vulnerability should interact in their effects on outcomes measures, this interaction has rarely received empirical support (for a review see Das, 2001). Several studies have found that “severity must reach a certain magnitude to figure in health decisions, but once this magnitude has been reached decisions are based solely on perceived susceptibility” (Abraham & Sheeran, 2005, p. 39). This importance of vulnerability (or susceptibility) for individuals’ response to risk is also supported by several meta-analyses that identified vulnerability as the strongest predictor of behavioural intentions as well as actual behaviour (Brewer et al., 2007; De Hoog et al., 2007). Further, experimental studies on the effects of fear appeals found that the impact of vulnerability information outweighed severity information in the effect of health messages (e.g., Das et al., 2003). In consequence, we may expect that news reporting of epidemic risk leads to different audience responses dependent on objective risk characteristics – or more precisely, on the information on objective risk characteristics contained in a news story, and we expect vulnerability to have a stronger impact on health intentions than severity.

With regards to the second point, health communication research further showed that objective risk characteristics themselves inevitably evoke emotion. Zikmund-Fisher, Fagerlin and Ubel (2010, p. 90) note: “[R]isk information is never received dispassionately but is always coded in affective and intuitive ways, too. Risks create feelings.” This suggests that
emotional responses to news coverage on health risks may not solely be attributed to an emotional portrayal of risk by the journalists, because the actual risk itself – and in that sense factual reporting on it – may likewise elicit emotional responses. Since the emotional impact of factual reporting on actual risk is mostly outside the control of the individual journalist (s/he could only decide not to report on it, or omit facts) and only the portrayal of risk (e.g., applying an emotional vs. factual reporting style) is within the bounds of her/his control, it is crucial to investigate what drives audience responses more strongly: objective risk characteristics or emotion-laden form.

Unfortunately, past studies on media effects have rarely systematically examined the effects of emotion-evoking media content and form across these two aspects of risk. Within the field of journalism research and media effects studies two types of research have provided evidence for the effects of emotion-evoking formal features on risk perception and affect. Firstly, research on news sensationalism found that sensationalist news features (features evoking sensory and emotional arousal), when included in stories covering threats, can induce heightened risk perceptions among audiences. This was found for emotion-arousing content (e.g., stories on a fire, tsunami, or violence) as well as for tabloid-style news packaging (e.g., music, close-ups, obstructive reporter voice), which may also steer emotions (Grabe et al., 2003).

Secondly, research on exemplification (Zillmann, 1999), which examines the impact of the use of exemplars (i.e., individual cases, anecdotal evidence) in news stories, showed that especially concrete, iconic, and emotionally arousing exemplars strongly influenced audiences’ perceptions (Zillmann, 2006). Although primarily interested in the effects of exemplification, these studies provide empirical evidence on the impact of emotion-evoking elements in news reports on (health) threats. News with emotive personal stories, such as the emotional account of a victim (Aust & Zillmann, 1996), or emotional imagery, such as explicit photographs of skin cancer melanoma (Zillmann & Gan, 1996; Zillmann et al., 1999) induced greater perceptions of the severity of and vulnerability to a risk and evoked stronger negative affect (e.g., distress) than news without emotive elements.

These findings resonate with insights gained in the fields of risk research and health communication that typically study risk judgment and decision-making in a non-news context. Consistent with the findings of
Zillmann and colleagues, risk research showed that in a non-news context emotion-evoking imagery, both photographs and audio-visuals, and emotion-eliciting language, likewise increased risk perceptions (Hendrickx, Vlek, & Oppewal, 1989; Hong, Lee, & Yu, 2010; Keller, Siegrist, & Gutscher, 2006; Sunstein, 2002, 2007; Visschers, Meertens, Passchier, & de Vries, 2008; Xie, Wang, Zhang, & Yu, 2011).

Emotion-evoking news coverage can further be expected to influence other types of individual responses that are relevant for the context of a health crisis. For example, risk and health communication research provided evidence that the emotions evoked by a risk message can influence behavioural intentions to reduce a health risk (Botta, Dunker, Fenson-Hood, Maltarich, & McDonald, 2008; Griffin, Neuwirth, Dunwoody, & Giese, 2004; Keer et al., 2010; Smith et al., 2008). Thus, it may be that an emotion-laden form of a news report influences behavioural intentions, perhaps even regardless of risk characteristics. Journalism scholars have noted that emotion-evoking news strengthens empathic response (Chouliaraki, 2006; 2008; Kyriakidou, 2015; Wahl-Jorgensen & Pantti, 2013). For example, Chouliaraki argued that emotion facilitates an involvement with victims and brings about “a sense of care and responsibility for the distant sufferer” (Chouliaraki, 2006, p.1), which in turn is viewed as a prerequisite for enabling public action (Chouliaraki, 2008). There is selected evidence supportive of this, specifically that emotion-evoking messages increases the willingness for philanthropic acts (Jenni & Loewenstein, 1997; Xie et al., 2011). Yet these studies investigate helping behaviour as – conceivably – a result of empathetic response, not empathetic response itself, which we aim to investigate with this study.


Though empirical evidence from the health domain shows that emotional news may aggravate risk perceptions, negative affect, and health behavioural intentions, journalism researchers have also proposed that audiences react with increased scepticism and disbelief to emotion-evoking elements, such
as in sensational news. Findings from a study by Grabe et al. (2000) suggest that audiences associate sensational, emotion-arousing news packaging techniques with tabloid or lower quality news, and use formal features as a guide to differentiate between the two. The study found that audiences rated stories with tabloid TV production features, such as music, sound effects, or an obtrusive reporter voice (features that have been defined as emotion-arousing and proved to have such effect), as less believable, less informative, less detached (i.e., objective) and also less enjoyable than stories without these features.

A later study with a similar set-up, investigating the influence of tabloid formal features in combination with either calm story topics (e.g., layoffs at a big corporation) or arousing (e.g., drive-by shootings) topics, found no effects on ratings of informativeness for either story. However, participants rated both calm and arousing stories as marginally less objective and as less believable if presented in an emotion-evoking form. Further, form and content interacted in their effects on perceived objectivity: emotion-arousing features decreased perceptions of objectivity especially for calm stories. In contrast to the aforementioned studies that examined TV news, Burgers and De Graaf (2013) found for print media that emotional language increased perceptions of newsworthiness and audiences’ evaluation of article quality (as interesting, useful, informative, pleasant or nice to read). In this study emotionality had no impact on believability.

In summary, previous research findings regarding news audiences’ evaluation of emotion-laden news are inconsistent. One potential explanation for these inconsistencies is that these studies did not take into account differences in objective risk (vulnerability, severity) combined with emotion-laden form. By looking at the combined effects of all three factors, the present study may help to remedy these inconsistencies. This study thus explicitly connects journalism and health communication research. Especially noteworthy is that the downplaying of the quality of a message observed in the aforementioned studies bears strong resemblance to reactance responses in persuasion studies (Rains, 2013) and to the defensive responses often observed following self-threatening health information (Das et al., 2003; De Hoog et al., 2007; Van ‘t Riet & Ruiter, 2013).

The present study explores two alternative explanations of responses to emotion-laden news. First, based on the premise that the notion of
sensationalism implies an exaggerated – or disproportionately emotional – portrayal of an (actually less threatening) risk, we may assume, that only if low risk is portrayed in an emotion-laden form audiences perceive the portrayal as sensational and of lower quality, whereas they might perceive an emotion-laden portrayal of high risk as justified. Thus, we would expect to find effects of emotion-laden form especially under conditions of low risk. Grabe et al. (2003)’s finding that a tabloid-style form decreased perceptions of objectivity especially for calm stories, provides tentative support for this assumption, as calm stories were often also low risk. Second, based on insights on defence mechanisms in health communication (e.g., Das et al., 2003; De Hoog et al., 2007) we may assume that a similar defence mechanism occurs in the context of news coverage on health risks. Specifically, we may expect that if an article evokes vulnerability to a severe risk, audiences might react with defensive processing, dismissing the article as bad quality and dramatized. While an emotion-laden portrayal may not necessarily automatically lead audiences to dismiss its content, it may thus be that audiences readily draw on the emotion-laden form as a reason to reject a news story’s truthfulness if they feel personally vulnerable to a risk. Accordingly, we may expect an interaction between emotional form and risk characteristics, especially under conditions of high risk (particularly high vulnerability).

The Present Study

The present research firstly set out to investigate what exactly drives various audience responses: an emotion-laden reporting style or objective risk characteristics? The reviewed findings from media and journalism research (Aust & Zillmann, 1996; Grabe et al., 2003; Zillmann & Gan, 1996) and from health (risk) research in a non-news setting (e.g., Hong et al., 2010; Sunstein, 2002, 2007) suggest that emotion-evoking form heightens risk perceptions, negative affect, but also that fear-evoking messages or affect influences behavioural intentions for risk-reducing behaviour (e.g., Keer et al., 2010; Smith et al., 2008). Further, evidence suggests that emotion-evoking messages increase behavioural intentions to engage in pro-social behaviours (Jenni & Loewenstein, 1997; Xie et al., 2011). Based on the
premise that such behaviours are motivated by empathy, we thus hypothesize that emotional news also increases empathy with victims. Accordingly, we posit the following hypotheses about the impact of emotion-laden form:

H1: Emotion-laden form increases perceptions of risk severity (H1a), risk vulnerability (H1b), negative affect (H1c), behavioural intentions (H1d), and empathy (H1e), compared to factual form.

Further, in line with health communication studies we expect information on objective risk characteristics to increase perceptions of the respective risk and negative affect (e.g., De Hoog et al., 2007; Witte & Allen, 2000; Zikmund-Fisher et al., 2010). Further, meta-analyses provide evidence for effects of vulnerability and severity on behavioural intentions with vulnerability being a stronger predictor (De Hoog et al., 2007; Witte & Allen, 2000). Accordingly, we expect both types of risk characteristics to increase behavioural intentions, however, we expect vulnerability to exert a stronger influence.

H2: News on risks with high severity increases perceptions of risk severity (H2a), negative affect (H2b), and health intentions (H2c) compared to news on risks with low severity.

H3: News on risks with high vulnerability increases perceptions of risk vulnerability (H3a), negative affect (H3b), and health intentions (H3c) compared to news on risks with low vulnerability.

H4: News on risks with high vulnerability increases health intentions more than on risks with high severity.

The fact that both emotion-evoking form and factual risk information increase risk perceptions, negative affect, and health behaviour intentions raises questions as to the interaction effects of both types of risk information and form. Previous research does not provide an answer with regard to interaction effects, therefore we pose the following research question:

RQ1: What are the combined, i.e., interacting, effects of objective risk characteristics and emotion-evoking form on partici-
pants’ responses – i.e., risk perceptions, negative affect, behavioural intentions, and empathy?

Furthermore, this research aims to reconcile seemingly conflicting effects of emotional news on risk perceptions and negative affect on the one hand, and the devaluation of the quality of a risk message or news article on the other hand. To explore alternative explanations, as discussed earlier, we investigate the following research questions:

RQ2: What are the independent and combined effects of objective risk characteristics and emotion-evoking form on perceptions of the article as sensationalist or dramatized?

RQ3: Does perceived sensationalism counteract – that is, mediate – the effects of news on participants’ responses?

Method

A total of 1709 participants completed an online survey experiment, in which they were randomly assigned to one of the eight conditions of a 2 (severity: low, high) x 2 (vulnerability: low, high) x 2 (formal news features: factual, emotional) between-subjects design.

Participants and Procedure

The study was conducted in the Netherlands, and data was collected via the Dutch I&O Research Panel, a nation-wide and representative panel. Participants were assigned one of eight versions of a newspaper article, and asked to read this “just as they would normally read the news”. Afterwards they filled in a questionnaire. Based on ethical considerations, participants were informed that the newspaper article was fictitious, however, we asked participants to envisage the article was real. The questionnaire concluded with a debriefing, reminding participants of the fabricated nature of the article and risk.

Of the 1709 panel members that participated, 165 were excluded based on a control question (stimulus not displayed correctly, n = 105) and
timers controlling for stimulus reading time (excluded if 0 sec, n = 59), and questionnaire completion time (excluded if 0 min, n = 1). Further, certain inclusion criteria were specified prior to analysis. We excluded participants with reading time of < 20 sec or > 80 min (n = 175) as under conditions of very superficial reading, manipulations, especially of emotional form, cannot work sufficiently. The same applies to large time gaps between reading the stimulus and filling in the questionnaire, thus we further excluded participants with completion time < 3 min or > 6 hrs (n = 27). Applying the inclusion criteria, the final sample consisted of 1324 participants (M_age = 56 years, SD = 14.50; 53.2 % female). Participants were predominantly of Dutch descent (99.1%), and more than half were highly educated (38.4% professional training, 21% university). Participants were distributed fairly equally across conditions (n: 643–681).

**Stimulus Materials**

For the purpose of the experiment eight different versions of a newspaper article on an epidemic outbreak were designed. We modified the risk information included in each story in order to manipulate objective risk characteristics, i.e., low versus high disease severity, and low versus high vulnerability. In addition, we manipulated article form by including various news elements that were found to be emotion-evoking in previous research, creating a factual vs. emotion-laden version.

All stimulus articles tackled the spread of a fictitious variant of the Enterovirus, which we termed Enterovirus D-74. The topic was chosen because the purpose of the study was to understand the formation of risk perceptions of an emerging health risk. Geographically bound outbreaks of enteroviruses occur episodically, and at times viruses mutate to more serious versions. Therefore the topic provided a relevant and credible news topic. All articles included the headline, a lead, a photograph and five paragraphs. The first paragraph announced the spread of a novel Enterovirus D-74 strain. After a brief description of a current outbreak in Asia, it stated that national health authorities had announced a first potential infection. The second paragraph specified the first (potential) case. The third paragraph described the response of authorities, as well as national and international preventive measures. The fourth paragraph described characteristics of the new virus, symptoms and severity. The final paragraph included a crisis as-
of the virus infection were altered, in three ways. First, in the low severity condition, the article stated that the virus causes “severe respiratory illness requiring hospitalization”. In the high severity condition it stated that the virus causes “severe respiratory illness requiring hospitalization, encephalitis (infection of the brain), and in some cases neurologic complications that have caused fatalities”. Second, for low severity, the virus has so far caused 21 hospitalizations, for high severity 21 fatalities. Third, the WHO’s assessment was adapted as follows:

**High severity:** “a World Health Organization official described this type of Enterovirus as ‘unusually dangerous’. ‘The virus is definitely one of the most lethal variants that has emerged’, says Dr. Keiji Fukuda”

**Low severity:** “a World Health Organization official described this type of Enterovirus as ‘worth watching, but not of high concern’. ‘We will continue to monitor the virus due to the way it spreads and the potential for hospitalization, but no one should be overly concerned at present’, says Dr. Keiji Fukuda”.

**Vulnerability.** Vulnerability was manipulated through disease proximity by altering the country in which the Enterovirus D-74 infection occurs. In the high vulnerability version the virus spreads to the country the study was conducted (the Netherlands), in the low vulnerability version to a distant place (Korea). Secondly, for high vulnerability we added a statement that emphasized the ease of disease transmission (as underlined): “The EV-74 strain transmits easily, like common cold and flu viruses, through saliva and can be caught by contact with an infected person, touching contaminated surfaces or drinking water with the virus in it.”

**Factual / emotion-evoking formal features.** We created a factual and an emotion-evoking version of the news report by adding several formal features that we derived from theoretical frameworks from news sensationalism, in which emotionality is a key dimension (Grabe et al., 2000;
Grabe et al., 2003; Hendriks Vettehen, Nuijten, & Peeters, 2008). As prior research found that photographs impact emotional response (Lang, Greenwald, Bradley, & Hamm, 1993) we firstly manipulated form by altering the photographs included in the article. Following Schaap and Pleijter (2012), who define photos of politicians as abstract, non-sensational and, in contrast, photos of laypersons (‘the average citizen’) as concrete and emotional, the factual version included a photograph of Dr. Keiji Fukuda, WHO Assistant Director-General for Health Security and Environment, whereas the high emotional version portrayed a layperson. More specifically, as photos can be classified as arousing (or emotional) if they portray so-called ‘survival topics’ (Hendriks Vettehen, Nuijten, & Beentjes, 2005; Nuijten, 2007; Schaap & Pleijter, 2012), the version in emotional form featured a photograph of a patient being transported to hospital (see Figure 1).

Figure 1. Photographs included in the factual version (left), and emotional version (right).

Secondly, we manipulated emotion-evoking language by adding semantic intensifiers (words that can be replaced with a less extreme version, such as disastrous in place of serious), and lexical intensifiers (words that can be removed from the text resulting in a decrease in intensity, such as very in the expression very serious). Additionally, we modified the specificity of language, i.e., its concreteness and vividness (Burgers & de Graaf, 2013). For example, the article stated “Chinese officials reported 680 cases and 21 deaths caused by the recent outbreak of this brutally [lexical intensifier] virulent strain.” (emotional form) versus “Chinese officials reported 680 cases and 21 deaths caused by the recent outbreak of this virulent strain.” (factual form). In addition, Wallis and Nerlich (2005) argue that journalists often include emotionality in news reports through militaristic language or war
metaphors (e.g., a virus described as an agent that actively infects and kills). Accordingly, we added militaristic language for emotional form.

Lastly, based on exemplification and news sensationalism research, we manipulated emotional form by including a vivid, concrete, and emotion-evoking personal story (Aust & Zillmann, 1996; Hendriks Vettehen et al., 2005, 2008; Zillmann, 2006). Whereas the factual article briefly stated that the victim was a 36-year businessman from the Netherlands/Korea, who fell severely ill after a business trip and had to be taken to the local hospital, the emotional condition includes an eyewitness account of his wife, who in an agitated manner and in the form of direct quotation gave a graphic account of what happened and what symptoms her husband suffered.

**Dependent Measures**

**Manipulation check.** To test whether the manipulation of emotion-laden form was successful, participants were asked to rate on 4-point Likert scales to what extent the picture and to what extent the article (text) was intense, emotional, frightening, vivid, factual, sober, unemotional ($\eta^2 = .72$). Manipulations of severity and vulnerability were tested with measures of perceived severity and perceived vulnerability reported below.

**Perceived severity and perceived vulnerability.** We measured risk perceptions, both of severity and vulnerability, with a 12-item, 7-point semantic differential scale extending commonly used scales from health communication (e.g., Das, de Wit, Vet, & Frijns, 2008; De Wit, Das, & Vet, 2008) by assessing both cognitive and affective risk perceptions (e.g., Loewenstein, Hsee, Weber, & Welch, 2001; Slovic, Finucane, Peters, & MacGregor, 2004). To measure *perceived severity*, participants were asked to evaluate the severity of the Enterovirus-D74 as mild – severe, harmless – harmful, non-critical – life-threatening (cognitive risk perception). Further, they indicated how they feel when they think about how serious it would be if they got infected with the Enterovirus on three semantic differential scales: scared – not scared, calm – anxious, worried – not worried (affective risk perception). To measure *perceived vulnerability*, participants were asked to estimate the likelihood of getting infected as unlikely – likely, impossible – possible, unrealistic – realistic (cognitive perception). Further, they were asked to indicate how they feel, when they think about the chance of
getting infected: scared – not scared, calm – anxious, worried – not worried (affective perception). Cognitive and affective responses for severity and vulnerability were combined into single indices respectively, as the scales for risk severity ($M = 4.56$, $SD = 1.27$; $\eta^2 = .89$) and for vulnerability ($M = 3.43$, $SD = 1.21$; $\eta^2 = .84$) proved reliable, and a factor analysis confirmed that all items aligned on these two risk factors.

**Negative affect.** We used a broader measure of *negative affect* rather than only measuring fear to capture also other related emotional responses such as worry and anxiety. Participants were asked to rate on three 7-point semantic-differential scales to what extent the article made them feel scared – not scared, calm – anxious, worried – not worried (selected items from Berger, 2007). The scale was internally consistent ($\eta^2 = .78$). Accordingly, all three items were collapsed into a mean index ($M = 3.34$, $SD = 1.36$).

**Behavioural intentions.** We measured *behavioural intentions* for two potential behaviours, information and taking precautionary measures. Participants were asked to indicate on a 7-point Likert scale if they intended to (a) search for more information about the Enterovirus, and (b) take actions to reduce their chance of Enterovirus. Both items ($r = .67$) were collapsed into a mean index ($M = 2.93$, $SD = 1.66$).

**Empathic response.** Audiences’ *empathic response* to the victim in the news article was measured with 3 items we selected and adapted from Shen’s (2010) scale for measuring state empathy during message processing. The items were “I can feel the victim’s emotions”; “I can understand what the victim was going through in the news article”; “I feel a need to support measures to help Enterovirus victims and prevent the spread of the virus”, measured on a 5-point Likert scale. The scale proved internally consistent ($\eta^2 = .80$), so the items were collapsed into a mean index ($M = 2.80$, $SD = 1.29$).

**Perceived sensationalism.** To measure how sensationalist audiences perceived the articles they read, respondents were asked to indicate whether they thought the article “exaggerated the risk of Enterovirus”, and “was sensationalist” on a 5-point Likert Scale ($r = .65$). Both items were collapsed into a mean index ($M = 2.71$, $SD = 0.83$).
Results

Manipulation Checks
All manipulations were successful. Participants rated the article in emotional form as significantly more emotional, $M = 2.27$, $SD = .36$, than that in factual form, $M = 2.06$, $SD = .39$; $t(1322) = 9.87$, $p < .001$, $\eta^2 = .07$. The high severity manipulation led to significantly higher severity ratings, $M = 4.99$, $SD = 1.14$, than the low severity manipulation, $M = 4.11$, $SD = 1.25$; $t(1322) = 13.41$, $p < .001$, $\eta^2 = .12$. Equally, the high vulnerability manipulation evoked significantly higher vulnerability ratings, $M = 3.60$, $SD = 1.19$, than the low vulnerability manipulation, $M = 3.27$, $SD = 1.21$; $t(1322) = 5.10$, $p < .001$, $\eta^2 = .02$.

Risk-Related Audience Responses
A 2 x 2 x 2 MANOVA was conducted to determine the impact of low vs. high severity, low vs. high vulnerability, and emotional vs. factual form on risk-related audience responses (perceived severity, perceived vulnerability, negative affect, behavioural intentions, empathic response), as well as possible interaction effects, particularly between form and the two risk characteristics. All significant omnibus results were followed up by univariate tests.

Table 1 shows the obtained omnibus results. The omnibus test yielded significant main effects of all experimental factors on at least one of the five dependent variables. Further, the analysis revealed a significant two-way interaction of vulnerability and severity. All remaining two-way or three-way interactions were non-significant. The results of follow-up ANOVAs are reported in Table 2.
Table 1. Omnibus Results – 2 (Low vs. High Severity) x 2 (Low vs. High Vulnerability) x 2 (Factual vs. Emotional Form) MANOVA on all Five Dependent Variables

<table>
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<th>Main and Interaction Effects</th>
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<th>$df$</th>
<th>$p$</th>
<th>$\eta^2$</th>
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<td>Independent variables main effect</td>
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<td>Emotionality manipulation</td>
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<td>(5, 1312)</td>
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<td>Vulnerability manipulation</td>
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<td>(5, 1312)</td>
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<td>Independent variables interaction effects</td>
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<td>(5, 1312)</td>
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</table>

Note. Multivariate statistic used was Pillai’s trace.

* $p < .05$. *** $p < .001$. Ns denotes that effect sizes were not calculated for statistically insignificant results.
<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>$M_{low}$ (SD)</th>
<th>$M_{high}$ (SD)</th>
<th>$F$</th>
<th>df</th>
<th>$p$</th>
<th>$\eta^2_p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Emotionality manipulation</strong></td>
<td></td>
<td></td>
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<tr>
<td>Perceived severity</td>
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<td>4.67 (1.22)</td>
<td>9.90</td>
<td>(1,1316)</td>
<td>**.01</td>
<td>.01</td>
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<td>3.39 (1.16)</td>
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<td>(1,1316)</td>
<td>.14</td>
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<tr>
<td>Negative affect</td>
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<td>3.38 (1.34)</td>
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<td>.46</td>
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<tr>
<td>Empathy</td>
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<td>3.00 (1.24)</td>
<td>30.23</td>
<td>(1,1316)</td>
<td>*** .02</td>
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<tr>
<td>Behavioural intentions</td>
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<td>2.90 (1.62)</td>
<td>1.21</td>
<td>(1,1316)</td>
<td>.27</td>
<td>ns</td>
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<tr>
<td><strong>Severity manipulation</strong></td>
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<tr>
<td>Perceived severity</td>
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<td>(1,1316)</td>
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<td>3.55 (1.22)</td>
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<td>(1,1316)</td>
<td>*** .01</td>
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<tr>
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<td>(1,1316)</td>
<td>*** .02</td>
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<td>(1,1316)</td>
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<td><strong>Vulnerability manipulation</strong></td>
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<tr>
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<td>4.97</td>
<td>(1,1316)</td>
<td>* .01</td>
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<tr>
<td>Perceived vulnerability</td>
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<td>3.60 (1.19)</td>
<td>26.29</td>
<td>(1,1316)</td>
<td>*** .02</td>
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<tr>
<td>Negative affect</td>
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<td>3.49 (1.38)</td>
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<td>(1,1316)</td>
<td>*** .01</td>
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<td>(1,1316)</td>
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<td>3.16 (1.66)</td>
<td>25.08</td>
<td>(1,1316)</td>
<td>*** .02</td>
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</tr>
</tbody>
</table>
Interaction Sev x Vul

<table>
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<tr>
<th></th>
<th>$M_{\text{lowS, lowV}}$</th>
<th>$M_{\text{lowS, highV}}$</th>
<th>$M_{\text{highS, lowV}}$</th>
<th>$M_{\text{highS, highV}}$</th>
<th>$F$</th>
<th>$df$</th>
<th>$p$</th>
<th>$\eta^2_p$</th>
<th>$\text{Note}$</th>
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<td>4.03 (1.19)</td>
<td>5.07 (1.19)</td>
<td>4.92 (1.09)</td>
<td>.01</td>
<td>(1,1316)</td>
<td>.94</td>
<td>ns</td>
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<tr>
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<td>3.44 (1.18)</td>
<td>3.35 (1.23)</td>
<td>3.75 (1.19)</td>
<td>1.38</td>
<td>(1,1316)</td>
<td>.24</td>
<td>ns</td>
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<tr>
<td>Negative affect</td>
<td>3.10 (1.32)</td>
<td>3.22 (1.39)</td>
<td>3.30 (1.31)</td>
<td>3.74 (1.32)</td>
<td>4.76</td>
<td>(1,1316)</td>
<td>*</td>
<td>.01</td>
<td></td>
</tr>
<tr>
<td>Empathy</td>
<td>2.63 (1.27)</td>
<td>2.70 (1.26)</td>
<td>2.89 (1.30)</td>
<td>2.98 (1.32)</td>
<td>.00</td>
<td>(1,1316)</td>
<td>.98</td>
<td>ns</td>
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</tr>
<tr>
<td>Behavioural intentions</td>
<td>2.62 (1.57)</td>
<td>2.88 (1.55)</td>
<td>2.79 (1.69)</td>
<td>3.42 (1.72)</td>
<td>4.42</td>
<td>(1,1316)</td>
<td>*</td>
<td>.01</td>
<td></td>
</tr>
</tbody>
</table>

Note. Multivariate statistic used was Pillai’s trace.

* $p < .05$. *** $p < .001$. Ns denotes that effect sizes were not calculated for statistically insignificant results.
A first ANOVA examining the univariate effects of form revealed significant effects on perceived severity and empathic response. In line with H1a and H1e participants who read the article in emotion-laden form perceived the risk as significantly more severe and responded with stronger empathy than those reading the factual article. However, contrary to expectations (H1b, H1c, and H1d), emotion-laden form did not significantly influence perceived vulnerability, negative affect or health intentions.

A second ANOVA examining the univariate effects of severity yielded significant effects on all dependent variables. Participants reading the news article with high severity information, perceived the severity of and their vulnerability to the health risk as significantly higher, experienced stronger negative affect, reporter greater intentions for performing risk-reducing behaviours, and felt stronger empathy with the victim than those reading the news article with low severity information. These results confirm hypotheses H2a through H2c.

A third ANOVA examining the univariate effects of vulnerability revealed significant effects on almost all outcomes variables. In line with hypotheses H3a through H3c, participants reading the news article stating that vulnerability is high, perceived greater vulnerability, experienced stronger negative affect, and reported higher behavioural intentions than those reading the news article stating that vulnerability is low. Results further confirm H4 stating that high vulnerability results in stronger health intentions than high severity information ($\eta^2_{\text{highVul}} = .02 > \eta^2_{\text{highSev}} = .01$), however, the difference was small. Lastly, univariate tests showed an interaction between the two risk characteristics on negative affect and behavioural intentions (Figures 2 and 3). Simple effects analyses indicated that participants reading the article with high as compared to low vulnerability reported more negative affect, yet only if the suggested severity was also high; $F(1, 1316) = 18.49, p < .001, \eta^2 = .01$. A similar pattern was observed for behavioural intentions. Participants reported stronger behavioural intentions regardless of whether suggested severity was low, $F(1, 1316) = 4.11, p = .04, \eta^2 = .01$, or high, $F(1, 1316) = 26.00, p < .001, \eta^2 = .02$, yet the difference was greater under conditions of high severity.
Figure 2. Interaction effects of risk vulnerability and severity on negative affect. Numbers indicate means; error bars represent 95% confidence interval around the mean.

Figure 3. Interaction effects of risk vulnerability and severity on behavioural intentions. Numbers indicate means; error bars represent 95% confidence interval around the mean.

These findings also provide an answer to RQ1 regarding the combined effects of objective risk characteristics and emotion-evoking form on participants’ response. No such combined effects between form and risk characteristics were observed. We only observed a combined effect of the two risk characteristics on behavioural intentions and negative affect.
**Mediating Effects of Perceived Sensationalism**

To test for potential countering effects of perceived sensationalism on the effects of the different version of the newspaper article on all five dependent variables (*negative affect, perceived severity, perceived vulnerability, behavioural intentions, and empathy*) we conducted a row of analyses based on procedures recommended by Hayes (2013). Our hypothesized conceptual model as shown in Figure 4 posited that the effects of article form on the five audience response variables could be mediated by perceived sensationalism. In addition, we posited that the effect of form on perceived sensationalism may be contingent on portrayed severity and the vulnerability of the actual risk (as moderators). We thus tested a moderated mediation model with ‘form’ as independent variable, risk severity and risk vulnerability as moderators and perceived sensationalism as mediator variable, running separate models for each of the five outcome variables. In the remainder, all regression coefficients are reported in unstandardized form.

*Figure 4. The conceptual moderated mediation model*

The moderated mediation hypothesis was tested in two steps and employing the SPSS “PROCESS” macro (Model 11) developed by Hayes (2013). First, we tested for a moderated moderation of the effect of article form on perceived sensationalism (mediator) by risk vulnerability and risk severity (this step was identical to performing a 3-way ANOVA). This analysis yielded significant effects of article form, $b = .11; p < .05$, and of risk vulnerability, $b = .10; p < .05$, on perceived sensationalism (mediator), however, not of risk severity. Further, the analysis yielded a significant 3-way interaction between form, vulnerability, and severity on perceived sensationalism ($b = -.42; p < 0.05$). No other interactions were significant. Estimating condi-
tional effects (“simple effects”) of the independent variable at each level of the moderators and their combinations using a pick-a-point approach (see Hayes & Matthes, 2009) indicated that form only affected perceived sensationalism if vulnerability information was low and severity information was high ($p < .01$), but not in any of the other constellations (all $p > .12$). This showed that participants perceived the article to be more sensationalist if it was presented in an emotion-laden compared to a factual form, but only if the displayed vulnerability to the risk was low and severity high.

As a second step, we tested the full moderated mediation model with an OLS regression and inspected the conditional indirect effect – i.e., the strength of the indirect effect depending on the value combinations of the two moderators (low, high). Bootstrap confidence intervals (bias corrected) indicated an identical pattern of all observed indirect effects on the outcome variables. Specifically, results showed significant indirect and negative effects of form on all five independent variables (negative affect, perceived severity and perceived vulnerability, behavioural intentions, and empathy) through perceived sensationalism, but only when vulnerability was low and severity was high ($all \ 0.6 < b < .09, all \ 0.2 < SE <0.3, and all 95\%\ CI [-.11 \ to -.15, -.02 \ to -.04]$), based on 5,000 bias-corrected bootstrap samples. In answer to RQ2, these results show that participants reading an article in emotion-laden form perceived it as more sensationalist than participants reading the factual article, but only if vulnerability was low (i.e., they did not feel personally affected) and severity high (i.e., the virus had serious health consequences). In answer to RQ3, results further demonstrate that perceived sensationalism counteracts the effects of news on participants’ response under these conditions. More specifically, participants who perceived the article as more sensationalist, perceived their vulnerability and risk severity as smaller, felt less negative affect, less empathy, and were less inclined to engage in risk-reducing behaviours.

Results additionally show that significant positive direct effects of form on two outcome variables remained (if controlled for the reported indirect effects): on perceived severity ($b = .25, SE = .07, 95\%\ CI = [.11, .38]$) and on empathy ($b = .41, SE = .07, 95\%\ CI = [.26, .55]$). This indicates that the reported conditional effects of form on perceived severity and empathic response are not entirely counteracted by a perception of the article as sensationalist.
Discussion

The present study set out to answer the question as to what exactly drives heightened risk perceptions and fear: emotion-laden reporting or real-world events, i.e., the objective risk characteristics, themselves? Results revealed that risk perceptions and negative affect were driven mostly by objective risk characteristics, not by emotion-laden form of an article. In fact, in the present study, the emotion-laden form of a news article only impacted how severe individuals perceived a risk, not whether they felt personally vulnerable, were afraid or worried. Our results are partially consistent with earlier studies, namely when demonstrating that emotion-evoking formal features of a news article increase audiences’ perceptions of severity (Aust & Zillmann, 1996). Yet, they are partially conflicting, when finding no impact of emotional form on feelings of vulnerability and negative emotions (cf. Gibson & Zillmann, 2000; Hong et al., 2010; Zillmann & Gan, 1996; Zillmann et al., 1999).

These divergences from earlier findings have two important implications. Firstly, the fact that emotion-laden news only impacted how serious audiences perceive a health risk is important considering that emotion-laden news have been widely criticized for causing harmful responses. Indeed, irrational fears have at times caused skyrocketing demands for flu vaccination, inducing shortages and threatening the containment of crises (May, 2005) or they lead to stigmatization and harsh treatment of victims, for example, during the recent Ebola outbreak (Yusuf et al., 2015). But the present findings suggest that such fears and the resultant behaviors, in contrast to common claims, cannot be attributed to emotional coverage alone. Rather, we find that objective risk information matters most. In consequence, our findings provide no strong support for the assumption that an emotion-laden style is to blame for this harmful impact. Rather it seems, if journalists overstate severity or vulnerability, in other words if they get the facts wrong, this may cause more harm than the choice for an emotional over a sober word, or a picture of a crying child over a picture of a politician.

Secondly, considering that our study was the first to test the effects of emotion-laden news in a close-to-real-life setting, the observed divergence from earlier findings may be indicative of the difference between the
impact of news in real life compared to laboratory or classroom settings. For example, across two studies Zillmann, Gibson and Sargent (1999) did not observe robust effects of emotion-evoking photographs in news reports on participants’ judgment of risk. Effects of emotions may be subtle and more likely to be uncovered in a setting where participants tend to read a news story more thoroughly, as given in an experimental setting. In our study, participants read the article in a naturalistic setting. Surrounding disrupting factors or interruptions may have attenuated the emotional effects of the news story, yet in real-life settings readers are often exposed to distractions and disruptions, especially in an age of digital news consumption (e.g., on smartphones). Based on our findings, we may speculate that effects are less intense if people do not read an article with highly focused attention as in laboratory settings. As a result, the impact of emotion-laden news may be less disconcerting than previously assumed.

Responses to article quality were affected by risk characteristics (especially vulnerability) and emotion-evoking form alike. Results indicate that audiences may only judge an article that reports emotionally (rather than factually) more sensational if the story covers a highly severe risk to which their personal vulnerability is low. An example of this would be a very emotion-laden portrayal of a deadly disease spreading in a far-away country. From earlier research, we had derived two possible ways in which audiences may respond to emotion-laden news reporting on epidemic outbreaks. The first pertains to the existence of a defence mechanism, as has been found in health communication studies (Das et al., 2003; De Hoog et al., 2007; Van ‘t Riet & Ruiter, 2013). The current study was to our knowledge the first to observe and examine this interesting parallel between defensive processing in health communication and defensive responses to emotion-laden news (devaluation of quality, e.g., as sensationalist, untrustworthy, subjective). Importantly, our findings show that perceptions of sensationalism are different to the defensive processing of health risks that are aimed at protecting the self-concept. Whereas defensive processing of health risks leads individuals to devalue the quality of health messages under high-vulnerability conditions, our study finds that individuals devalue the quality of emotion-laden news only under conditions of low vulnerability.

These findings suggest that perceptions of sensationalism imply a disproportionately emotional portrayal of an objectively less threatening
risk. Findings are also consistent with Grabe et al. (2003) who found a comparable pattern: if calm stories were portrayed in a sensationalist style these were perceived as less objective than if arousing stories were depicted the same way. Interestingly though, the results of this study extend previous findings by showing that whether laymen experience news as sensationalist, primarily depends on higher levels of personal concern rather than the severity of an objective risk. Individuals judged emotional coverage sensational if an issue of low personal risk was portrayed in an emotional manner, but they did not show the same response to issues with low severity that were portrayed emotionally. We would argue that in the context of health risks messages, receivers take their personal vulnerability to a sufficiently serious health risk as an anchor against which to judge the validity of the news reporting, not the only the seriousness of this risk. To illustrate, following our findings, Western audiences would be inclined to perceive emotional coverage on Ebola as sensational, as it pertains to a disease with highly serious health consequences that does, however, not affect them. This is regardless of the fact that the severity of the Ebola itself might more objectively be deemed worthy of emotion.

Lastly, we aimed at reconciling paradoxical findings from earlier research, namely that emotion-evoking news on the one hand increases risk perceptions and fear, while on the other hand may instigate distrust in users. We conducted a mediation analysis to test the hypothesis of potential counteracting effects, which enabled us to provide evidence for the existence of such an effect, however, only under conditions of low vulnerability and high severity. In other words, participants corrected for a portrayal they apparently found too emotion-laden when they were personally unaffected. The conclusion we can derive from this finding is that audiences do not respond with doubled disbelief if an emotion-eliciting form is coupled with emotional content, rather discrediting only occurs under specific conditions, which may explain the finding of the paradoxical effects in earlier studies. Furthermore, we found that countering effects were only small and did not completely mediate the effects of emotion-laden form on how users responded to the article. Accordingly, while perceived sensationalism may partially counter the effects of emotional news, it may not do so entirely.
Limitations
The current study carries several limitations. Firstly, despite successfully inducing significantly different levels of emotionality, the induced levels of emotionality were not high. Even the article in emotion-laden form was still perceived as moderately emotional only, which may have impacted the strength of effects. Further, our choice for an online experiment in a naturalistic setting has the drawback of lesser control than a study in laboratory settings. This may be a reason for the small effects observed in this study. However, this trade-off allows for drawing conclusions with higher external validity, as it is conceivable that news are often consumed in less focused ways or with interruptions. On the other hand, our choice for an imaginative scenario of a health crisis challenges external validity, still we considered this choice necessary given ethical considerations. In an actual epidemic situation responses may be more intuitive, impulsive, and irrational, which we may not have not been able to evoke or simulate in the present study. Lastly, since this study focused on impacts of emotion-laden form, our manipulations did not consider other factors commonly associated with tabloid or sensational journalism, particularly elements of layout such as multiple photographs or typographical elements (e.g., large, often red, fonts). Unfortunately, research on the layout elements that define sensationalist reporting is scarce, thus making it difficult to develop substantiated expectations of specific effects. It would be desirable that future studies examine alternative manipulations of emotion-laden coverage.

In summary, the present study revealed that heightened negative affect and risk perceptions are primarily influenced by objective risk characteristics rather than, as often assumed, an overly emotional portrayal of risk in news coverage. Accordingly, they are driven by real-world events, factors that cannot be located within the bounds of control of the individual journalist. This does not mean that news coverage may not contribute to intensified fears and risk perceptions, but it shows that emotion-laden coverage, the usual suspect, may not be the actual culprit. Furthermore, it indicates that audiences are capable of recognizing overly emotional news and consider these as sensational if they feel an issue that is of little personal concern to them is portrayed in an emotionalizing matter. Perceptions of sensationalism, in turn, counteract effects of emotion-laden news on risk perceptions and fear.
Footnotes

1 The panel is representative (ISO 26362 certified), consisting of approximately 20,000 active members that were recruited offline based on random samplings of individuals and households.

2 MANOVA was chosen because all dependent variables are conceptually related, and further moderately positively correlated (range: $r = .284$ to $.621$), in which case Brace et al. (2006) advise a MANOVA procedure.