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MEDIATIZATION AND THE DISPROPORTIONATE ATTENTION TO NEGATIVE NEWS

The case of airplane crashes

**Toni G. L. A. van der Meer, Anne C. Kroon, Piet Verhoeven, and
Jeroen Jonkman**

Do news media increasingly portray a distorted world image when reporting menace? The purpose of this study is to investigate how media attention for negative incidents evolves over time and how this relates to real-world trends and public responses. A longitudinal content analysis (1991–2015) of media coverage of aviation incidents is used to provide a systematic investigation into the trends of media attention related to real-world data. Results show that while the total number of aviation incidents declined across time, relative media attention increased. Time series analysis revealed that media attention for these negative incidents was negatively associated with shifts in public responses—i.e. air travel behavior—whereas real-world statistics on aviation incidents did not seem to explain variation in public behavior. Moreover, when exploring the variation in the coverage of media attention, increasing presence of mediatization facets was observed as a potential explanation for the over-time rise in disproportional attention to negative news. In conclusion, news media may have a blind spot for progression and a distorted media reality can be a predictor of public responses instead of reality itself.

KEYWORDS mediatization; negative news; news media logics; public responses; time series analysis

Introduction

News media are often accused of creating a distorted reality (e.g. Kitzinger 1999). First, in their reportage, media are frequently skewed toward the negative side if it comes to selecting news items (Hester and Gibson 2003). The journalistic tendency to focus on negative news is repeatedly considered an outcome of routine selection procedures of those stories that are believed to garner the highest ratings (e.g. Altheide 1997; Lawrence and Mueller 2003). Second, infrequent and isolated incidents have become part of the daily-news reportage, turning these rare events into the common world image (Altheide 1997; Park et al. 2009). As news develops a life of its own, one can observe discrepancies between what actually happens in the world and how the media portray it. Consequently, this research is broadly concerned with the role of the news media in processes of social construction and amplification of low-probability high-consequence negative incidents.

Scholars have argued that, as a consequence of increased commercial pressures on news media institutions, media's penchant for the negative and the exceptional has become more prominent over time (e.g. Farnsworth and Robert Lichter 2006; Semetko and Schoenbach 2003). Indeed, it has been argued that factors such as negativity have grown to become among the most dominant selection criteria of today's media logics (e.g. Lawrence and Mueller 2003; Park et al. 2009). Motivated by the significant social consequences of this alleged trend, scholars have attempted to empirically investigate *how* journalists cover negative incidents and with *what consequences*. These studies agree that a biased reflection of reality, shown by the news media, can have severe cultivating consequences for public perception, especially when negative events are overrepresented or when severity is exaggerated (Renn et al. 1992).

Extant empirical research has mainly scrutinized journalists' disposition to negative incidents in the context of specific cases and relatively short time periods (see, for example, the literature on "media hypes": Vasterman 2005). Yet, previous research has fallen short of answering the question whether media coverage has grown further apart from real-world developments over time. Thus, the research problem this study aims to address questions whether media bias toward negative incidents has become more prominent over time. In other words, does the volume of media reports on negative or risk-related incidents increase over time while real-world data show a decreasing trend of these incidents and how do these patterns relate to public responses? By exploring the relation between patterns in news attention and trends of real-world events, this research touches upon the journalistic core principle of news production (Jacobs et al. 2017).

In an attempt to understand over-time patterns of incongruence between media coverage and real-world data, the study draws on insights from the theory of mediatization, as a long-term journalistic and social development. At heart, mediatization emphasizes a process of social change in which media have become deeply integrated into different levels of society (Hjarvard 2013; Mazzoleni 2008; Strömbäck and Esser 2009; Strömbäck and Esser 2014). Mediatization has been defined as a long-term process through which the importance of the media and their spillover effects on society has increased (Strömbäck and Esser 2014). Not only have media become more institutionalized, also institutional characteristics of news media, including standards of newsworthiness, have changed. Under the conditions of mediatization, certain facets have become more prominent in media coverage, such as a focus on negativity, conflicts, and human-interest exemplars (e.g. D'Angelo and Esser 2014; Peleg and Bogoch 2014; Djerf-Pierre et al. 2014). The increased prominence of these facets and the tendency to select negative information in journalistic selection processes advocates an increased misrepresentation or exaggeration of negative incidents compared to reality. Ergo, mediatization can potentially serve as an overarching theoretical framework to understand the over-time change in the coverage of negative incidents and the observed patterns in the findings from previous research with different theoretical starting points.

In order to explore whether media increasingly portray the world in terms of menace rather than accuracy, this study's overall goal is to map the longitudinal process of media attention to and coverage of negative incidents and evaluate to what extent this reflects real-world trends and affects public responses. Therefore, this research relies on the case of media attention for aviation incidents or airplane crashes. With today's advanced aeronautical technology and weather forecasting, transportation via airplane is proven to be the safest among all transport modes (Li et al. 2015). Nevertheless, catastrophic aviation incidents cannot be avoided. Despite the relative infrequency of these incidents, commercial

airplane crashes often result in strong public reactions and concerns, like social panic and (irrational) risk-avoiding behavior, accompanied by substantial social political and economic impacts (Romantan 2005). To explore the role of news media in the process of social construction and amplification of aviation incidents, this study links media coverage and real-world data. First, a longitudinal investigation of trends in aviation incidents news for the period 1991–2015 is presented, drawing comparisons between patterns in news attention and real-world incidents. Second, it is tested if these trends in media volume and real-world data can explain actual public responses—i.e. air travel behavior. Third, it is explored if news media coverage of these negative incidents increasingly contains facets of mediatization by relying on unsupervised automated content analysis. Herewith, the study contributes to our understanding of *whether* and *how* media's attention for and portrayal of negative incidents changes over time and with *what effects*. Moreover, the presented findings add to the literature on mediatization, which falls short of providing empirical support for its conceptual definitions (Strömbäck and Esser 2014; Van Aelst et al. 2014) and has yet to be linked to the coverage of negative incidents.

Theory

News media play an essential role in our society. The public depends on mass media as a source of information for understanding what happens in the world (Edelman 1988). As a result, audiences' knowledge and perceptions of events are commonly based on what is covered in the news (Lawrence and Mueller 2003). This process highlights news media's gatekeeping function, where journalists and editorial boards determine which events make it into the news and which do not (Shoemaker and Reese 1996; Shoemaker and Vos 2009). In deciding what the audience is exposed to, news media can constitute and portray a so-called alternative social reality (Altheide 1976; Vasterman 2005) that might deviate from reality based on hard numerical real-world indicators (Jacobs et al. 2017). This presented alternative social reality can be explained by the media logic that steers the production of news and other media content (Altheide and Snow 1979).

In their gatekeeper function, media and journalists often struggle to completely cover what happens in society. Media have to decide which events they cover and which not due to restriction in resources and limited carrying capacity (Hilgartner and Bosk 1988; Gans 2004). Additionally, since news can never be a complete representation of reality, the aim is to reduce the complexity and simplify news selection with the use of certain standardized news production processes. Journalists commonly rely on selection heuristics, often conceptualized as news values such as negativity, proximity, and unexpectedness (Galtung and Ruge 1965; Harcup and O'Neill 2001). In this complex and often hasty selection and production process, certain biases in the amount of attention for and coverage of certain events or issues will occur.

Previous scholars have relied on a variety of theoretical starting points to empirically address media biases. As a result, the research field studying media bias could, at least to a certain extent, be characterized as fragmented. In the subsequent section of the theory discussion, we first discuss *attention to negative news* by relying on episodic versus thematic framing, the theory of news values, and a variety of empirical findings from extant research. Second, *the effect of media coverage of negative incidents* will be addressed with the use of exemplification theory, agenda setting, and framing theory. Finally, in an attempt to integrate the variety of theoretical approaches related to media bias and understand how

this phenomenon has changed over a longer time period, we introduce mediatization as a potentially applicable and comprehensive framework. Therefore, this study theoretically explores, and empirically tests, if mediatization can serve as an overarching theoretical framework to understand the discrepancy between media attention and real-world developments in the context of a changing media environment.

Disproportional Attention to Negative News

Since news is by definition about the extraordinary and exceptional, media are commonly found to portray infrequent and isolated incidents rather than simply mirror reality (Lawrence and Mueller 2003; Park et al. 2009). Consequently, this event-driven media coverage does not accurately reflect the underlying complex realities of day-to-day events and long-term socioeconomic trends (Gibson and Zillmann 1994; Kollmeyer 2004), resulting in a distortion bias (Entman 2007). Thus, in a paradoxical way, the infrequency of certain incidents partly explains why they receive more media attention. Also, in other work, it is suggested that news stories are often primed and framed as “episodic” and not as “thematic” (Iyengar 1991). Episodic framing focuses on individual circumstance and discrete events, whereas thematic framing focuses on general context and collective outcomes (Gilliam and Iyengar 2000; Iyengar 1991). With the strong focus on isolated incidents and individual circumstances, news tends to overshadow discussions of the broader social, psychological, and political context or trends that give rise to complex issues (Edelman 1988).

In their skewed and event-driven coverage, media tend to overemphasize negative news (Aday 2010; Hester and Gibson 2003). There are several explanations concerning why journalists are prone to select information with negative characteristics. News value theory provides several news characteristics or news values that play an essential role in the journalistic process of deciding what information should be considered news and would attract a large audience (Galtung and Ruge 1965; Harcup and O’Neill 2001). Amongst these inherent factors of newsworthiness is “reference to something negative” because negative news is seen as unambiguous, consensual, unexpected, and to occur over a shorter period of time than positive news (Galtung and Ruge 1965). Thus, the disproportionate attention to negative stories is often considered a result of news media and journalists’ attempt to attract public attention (e.g. Altheide 1997; Lawrence and Mueller 2003). In this process, the most newsworthy stories are dramatic and sensational rather than mundane (Ditton et al. 2004; Romer, Jamieson, and Aday 2003). In sum, “good news” is generally seen as less interesting than “bad news” (Aday 2010).

It is essential to be aware of the ways in which media function as subjective gatekeepers when selecting negative stories over positive ones (Lawrence 2000). Accordingly, there is voluminous literature documenting media’s negativity bias in a variety of contexts, e.g. violent crime news (Gilliam and Iyengar 2000; Klite, Bardwell, and Salzman 1997; Singer 1983), scandal-based and otherwise-negative political coverage (Cappella and Jamieson 1997; Niven 2001; Sabato 2000), overrepresenting racial minorities in crime coverage (Entman 1994; Gilliam and Iyengar 2000), economic news (Kollmeyer 2004), and violence occurring at protests (Gitlin 1980).

With media’s disproportional attention for isolated events and negative news, it is expected that news does not offer a correct representation of the occurrence of negative incidents such as aviation incidents. What is more, it is assumed that this distortion has gradually increased over the past decades. Trends towards commercialization and

professionalization are often held responsible for the alleged increase in focus on the negative and exceptional. Some empirical support exists for this assumption. In the context of political communication, studies have documented the discrepancies between media coverage and real-world developments (e.g. Jacobs et al. 2017; Vliegenthart and Boomgaarden 2007) and the over-time tendency of media to become increasingly focused on negative incidents (e.g. Farnsworth and Robert Lichter 2006; Semetko and Schoenbach 2003). These observations lead us to hypothesize that, with transportation via airplane becoming safer over the years, real-world data (i.e. actual aviation incidents) show a decreasing trend while news coverage on aviation incidents follows an increasing over-time trend. Against this backdrop, we formulate the following hypothesis:

H1: Media attention for negative incidents (i.e. aviation incidents) follows a different over-time trend as compared to the real-world indicators of these negative incidents.

The Effect of Media Coverage of Negative Incidents

A distorted reality presented in the news can have far-reaching consequences. When media over-represent negative news and exaggerate severity, the public might overestimate its frequency and misperceive reality. Inaccurate expectations are often strongly related to media exposure, which, in turn, can play a crucial role in determining the overall intensity and scope of societal impacts (Renn et al. 1992).

Several theoretical frameworks are helpful in understanding the persuasive effects of media's distorted coverage and emphasis on negative information. To start, exemplification theory offers a cognitive explanation for strong public responses to exposure of negative incidents in the media. In this theory, exemplars are those events that are used to exemplify a larger population of events that have common characteristics; the event is the exemplification of a property in an entity (Zillmann and Brosius 2012). The theory argues that media's tendency to be strongly *event-driven* can be highly consequential as the presentation of examples of engaging events rather than base-rate information is more vivid and attractive to readers or viewers (Gibson and Zillmann 1994; Vliegenthart and Boomgaarden 2007). As individuals form perceptions on the basis of information presented in media exemplars (Gibson and Zillmann 1994), they tend to overestimate their frequency and consequences (Entman 1994). The influence of exemplars applies most directly to the cognitive devices of availability and accessibility heuristics. When exemplifying instances quickly come to mind and are readily accessible, they are likely to exert a dominant influence on individuals' judgment and behavioral intentions (Sanbonmatsu and Fazio 1991; Tversky and Kahneman 1973). Therefore, it could be considered problematic when individuals base their assessment on exemplars in the news, especially when exemplars are atypical and chosen for its sensational qualities.

In addition, traditional communication theories inform us how negative news coverage about incidents can have a particular strong impact on public responses. First, in the context of agenda-setting theory, the compelling-argument hypothesis states that some object attributes emphasized by the news media exert a greater effect on public responses than others (McCombs 2004; McCombs and Ghanem 2003). Importantly, a negative (rather than positive) evaluative tone of media coverage results in higher levels of perceived issue importance, as information about negative incidents captures our attention far more than information about positive ones (Sheafer 2007; Cacioppo and Berntson 1994; Marcus,

Neuman, and MacKuen 2002; Mutz 1998). Second, and in a similar vein, framing research has empirically documented a negativity bias in several contexts (Soroka 2006). These framing studies show that negative (vs. positive) valenced framing exerts disproportional strong effects on public perception and behavior, as negative information carries more value compared to positive information (Akhtar et al. 2011; Fang and Peress 2009; Tetlock 2007; Tetlock, Saar-Tsechansky, and Macskassy 2008; Van der Meer and Vliegenthart 2017). Overall, people are wired to watch out for threats and respond stronger to negative stimuli with greater attention and stronger emotional responses (Knobloch-Westerwick, Mothes, and Polavin 2017).

Numerous studies empirically demonstrate that media's distortion of reality and negativity bias can have a profound effect on public opinion. For example, media emphasizing or hyping violence committed by social movement groups or minorities fosters negative attitudes towards those groups for those exposed to this news (Entman 1993; Gilliam and Iyengar 2000; Gitlin 1980); exaggerating the incidence of violent crime makes crime a more salient issue in the minds of audiences (Gross and Aday 2003); and a focus on political scandal activates political cynicism (Cappella and Jamieson 1997; Sabato 2000). Exposure to negatively loaded news cannot only alter perception but may even result in the amplification of perceived risk or actual behavior. For example, media exposure has been related to increased fear of and concern about crime despite declining trends in crime (Gerbner and Gross 1976; Romer, Jamieson, and Aday 2003; Gross and Aday 2003), social reality judgments regarding race (Dixon 2006a, 2006b; Gilliam and Iyengar 2000; Entman 1993; Gitlin 1980), and reinforced imitation of suicide by frequent reportage on suicide (Pirkis et al. 2006). Moreover, by exaggerating consequences, media have been found to be significant contributors to the construction of worries about airline safety management (Li et al. 2015).

With the prominent effect of event-driven and negative media coverage, it is expected that coverage on aviation incidents can not only have an effect on public perceptions but also on actual public behavior. Therefore, for the second hypothesis, over-time variation in media coverage of aviation incidents will be correlated with aggregate-level patterns of air travel behavior. The second hypothesis reads as follows:

H2: Media attention for negative incidents (i.e. aviation incidents) is negatively associated with public responses (i.e. air travel behavior).

Mediatization and Disproportional Attention for Negative News

Over-time processes of increasing media logic could potentially explain the hypothesized rising trend of media attention for negative incidents. Therefore, we explore if mediatization can serve as an overarching theoretical framework to understand a potential increase in the discrepancy between media attention and real-world developments.

During the last decade, the academic interest in the phenomenon of mediatization increased substantially, especially in the context of political communication (for an overview, see e.g. Strömbäck and Esser 2014; Hjarvard 2013). In general, scholars describe mediatization as a long-term dynamic process in the course of which the mass media become increasingly influential in and deeply integrated into different levels of society (Hjarvard 2013; Mazzoleni 2008; Strömbäck 2008; Strömbäck and Esser 2009, 2014). Mediatization goes beyond the notion of mediation—i.e. transmission of communication through

media—as a broader and more dynamic concept referring to integrated processes of increasing media importance and influence within modern society (Couldry and Hepp 2013; Esser 2013; Hjarvard 2013; Strömbäck and Esser 2009). In his prominent conceptualization, Strömbäck (2008) analytically splits mediatization of politics into four dimensions all described as continuums: (1) media as most important sources of information, (2) degree of media autonomy, (3) media content mainly governed by media logic, and (4) external (political) actors adapt to media logic. Mediatization is a too complex phenomenon to be empirically investigated in its entirety (Magin 2015). The current analysis focuses on the importance of media logic in media coverage and thus on media practices to understand *increasing* attention for negative incidents over time. Therefore, this paper is mainly concerned with how institutional characteristics of news media, including standards of newsworthiness and production/framing routines, have changed under the conditions of mediatization.

From the perspective of mediatization, the way of presenting and emphasizing news is increasingly driven by media logic (Altheide and Snow 1979; Mazzoleni 2008). This logic refers to the institutional and sociological characteristics of news media, including format features, production and dissemination routines, norms and needs, standards of newsworthiness, and the formal and informal rules that govern news media (Strömbäck 2011). Shaped by media logic, news media predominantly selects news items that fit well into the patterns of news values as pivotal selection criteria. Additionally, the selected items are molded in form and content in line with the media logic (Altheide and Snow 1979; Strömbäck and Esser 2014). Esser (2013) conceptualized typical aspects of media logic altering news practices: (1) change in journalistic norms where media has become more independent and guided by public interest (professional aspect), (2) autonomous media becoming more dependent on commercial imperatives (commercial aspects), and (3) media rely more on different media types and technological affordances (technological aspects).

Numerous scholars argue that the degree of mediatization and media logic have increased over time in media coverage (e.g. Brants and Van Praag 2006; Magin 2015). The media's selection and framing of news have always been guided by the intention to attract the audience's attention. Nevertheless, the decreasing press-party parallelism and media's growing commercial orientation has strengthened the motives and effort to gain the largest possible audience media can get (Hallin and Mancini 2011; Strömbäck 2008), making public attention the "steering medium" of the media's mediatization (Kunelius and Reunanen 2012).

At this point, mediatization theory is far from being empirically saturated (Deacon and Stanyer 2014; Magin 2015), yet scholars assume that, with mediatization, certain facets become more prominent in media coverage, such as conflict framing, human-interest framing, general negativity, journalistic interventionism, and sensationalism (e.g. D'Angelo and Esser 2014; Peleg and Bogoch 2014; Haßler, Maurer, and Oschatz 2014; Sampert et al. 2014; Esser, Strömbäck, and de Vreese 2012; Djerf-Pierre et al. 2014). Therefore, if mediatization can be an explanation for rising media attention for negative incidents, it is expected that coverage of negative incidents, such as aviation incidents, increasingly contain facets of mediatization. Therefore, this paper aims to offer a first exploration of the following research question:

RQ1: Does news media coverage of negative incidents (i.e. aviation incidents) increasingly contain facets of mediatization?

Method

This research applies a longitudinal design of both real-world data and a combination of media attention and coverage. As mentioned above, this research empirically studies aviation incidents and news coverage about these incidents as this provides a useful case of comparable negative incidents that have continually occurred over the last decades. Moreover, the real-world occurrence of these plane crashes is well documented over time and these incidents resulted in substantial media attention that can be collected for analysis. This type of data enables the exploration of trends over time.

Media Attention

A census of all news stories about aviation incidents in Dutch newspapers was retrieved from the archive available in the LexisNexis database. This study relies on a time frame from January 1991 till December 2015. This frame was selected because 1991 was the first year that national Dutch newspaper articles could be retrieved from the LexisNexis database. The media attention for aviation incidents was established on the basis of a computer-assisted content analysis of the largest Dutch national newspapers (de Volkskrant, de Telegraaf, Algemeen Dagblad, and NRC Handelsblad) as it is assumed that national newspapers cover more (inter)national aviation accidents as compared to regional newspapers. All articles that mentioned an airplane crash, using the search string "airplane OR airline OR airways (excluding military airplanes) AND crash OR downed (including other Dutch synonyms for crash) OR disaster" were selected, resulting in a total number of 9443 articles. Through an iterative process, search strings were optimized in terms of exclusion and exhaustion by globally scanning the texts to ascertain the articles' topic. Additionally, the total numbers of all published articles in these newspapers were collected ($N = 3,463,885$) so the relative increase in media attention could be calculated. More specifically, we divided the yearly/monthly number of news articles about aviation incidents by the yearly/monthly total number of news articles published in the selected newspapers. In doing so, we avoid that a trend is observed that is caused by the increased circulation or number of articles in a single newspaper over the years.

Content Characteristics of Media Coverage

To explore if the newspaper articles on aviation incidents increasingly contain facets of mediatization, an inductive automated content analysis was applied. This analysis identifies latent patterns in text by interpreting word (co-)occurrences. This automated content analysis is based on the notion that meaning of an event or issue is created in the (co-)occurrence of words and their relative position in a network. This approach maps groups of correlated words and articles together to form a distinctive meaningful classification which helps to inductively describe a large dataset of texts with fewer dimensions in a more replicable way with less subjective interferences (Grimmer and Stewart 2013).

This study relies on a combination of two classes of fully automated clustering approaches to obtain meaningful clusters that can be compared across different time phases in the data. First, Latent Dirichlet™ Allocation (LDA), a widely used probabilistic topic-modeling approach, relies on a suite of algorithms that can identify a mixture of topics in one document (Řehůřek and Sojka 2010). Second, the cluster analysis k-means

clustering (Grimmer and Stewart 2013), as a single membership model, assigns sets of documents or words in mutually exclusive groups so they become part of the same cluster or frame. To ensure that the analyses identify more generic frames that are comparable across different time phases, a combination of both LDA and k-means clustering analyses is used. This combined clusters analysis avoids that the frames are too issue specific or relate to independent events in the news (for a comparable approach see Van der Meer 2016).

Several steps were taken to complete the clustering of the texts. First, the data were pre-processed by simplifying the vocabulary of articles with stemming. Also, stop-words were removed including search strings. Second, term frequency-inverse document frequency weighting was applied to reflect word importance in the corpus. Third, the data were transformed into a document-term matrix that serves as the input for the cluster analysis. Fourth, latent Dirichlet™ allocation was performed using a Python script (Řehůřek and Sojka 2010). The python gensim algorithm module (Řehůřek and Sojka 2010) is used for conducting the LDA categorization (see, e.g. for more details on LDA, Jacobi, van Atteveldt, and Welbers 2016; Řehůřek and Sojka 2010). The output of the LDA provided 50 topics formed by word combinations. A score for each topic was automatically assigned to each article. Fourth, the topic scores, generated by the LDA analysis, were used as input for a k-means cluster analysis to further reduce the complexity of the text. This analysis provided six clusters of related topics that are commonly interpreted as the frames embedded in text (for more details on k-means clustering, see, for example, Burscher, Vliegthart, and De Vreese 2015; Grimmer and Stewart 2013). Then the k-means cluster analysis automatically assigned each article to one of the six clusters for which its distance to the cluster center is the smallest. Finally, each cluster was given a frame label based on the words that form the clustered topics. By inspecting the words that form the topics, the combination of topics, and a selection of the articles that are assigned to these frames, the researchers determined what the clustering refers to, how the frame can be interpreted, and labeled. For example, one frame is labeled as “technical safety frame” as this frame consists of a cluster of topics like “safety rules” and “technical investigation”. These topics are labeled by the words that form the topics (“safety rules” was formed by a cluster of words such as air traffic, safety rules, aviation and “technical investigation” by words as investigation, landing, plane, technical errors).

The data were analyzed separately for several research periods to explore the development of media coverage over time. Previous research has shown how a description of data, based on automated content analysis, can be applicable to explore over time processes and changes in media emphasis and variation in coverage (Jonkman and Verhoeven 2013; Leydesdorff and Hellsten 2006; Van der Meer et al. 2014).

Real-world Data: Aviation Incidents

Statistics on the number of aviation incidents were collected to investigate whether discrepancy exists between media coverage and real-world data. This measure was the yearly sum of commercial airplane crashes that occurred between 1991 and 2015. We relied on the National Transportation Safety Board’s database. In the analysis, also the number of fatalities and plane crashes in Europe were taken into account as (societal) impact or range and geographical closeness might explain media attention and public responses.

Public Behavioral Response: Air Travel Behavior

To explore how the public responds to media attention for aviation incidents, the monthly number of passengers boarding scheduled flights departing from the Netherlands was obtained from Statistics Netherlands' StatLine (excluding direct-transit passengers).

Yearly Trend Variable

A yearly trend variable was computed, with the incremental values for each year in the research period. The values range from 1 (year: 1991) to 24 (year: 2015).

Results

In order to test if media attention for aviation incidents follows a different over time trend as compared to real-world statistics on number of aviation incidents (H1), the effect of a linear yearly trend variable on media attention and number of aviation incidents is compared to observed differences in over-time variation. Ordinary least squares regression analyses showed that the trend variable had a significant positive effect on relative media attention for aviation incidents ($b = .60, p < 0.01$), whereas a negative effect was found for total airplane crashes ($b = -.93, p < 0.001$), total airplane crashes in Europe ($b = -.75, p < 0.005$), and total fatalities due to aviation incidents ($b = -.85, p < 0.001$). In other words, the relative media attention is found to go up over the years, despite that the number of yearly aviation incidents drops. Figure 1 provides a graphical representation of the over time changes for media attention and number of aviation incidents. A clear picture evolves by comparing the linear trend lines for relative media attention and total number of aviation incidents. In line with the effect of the trend variable, the visualized trend line for media attention shows a rise from 1991 till 2015, while a downward trend

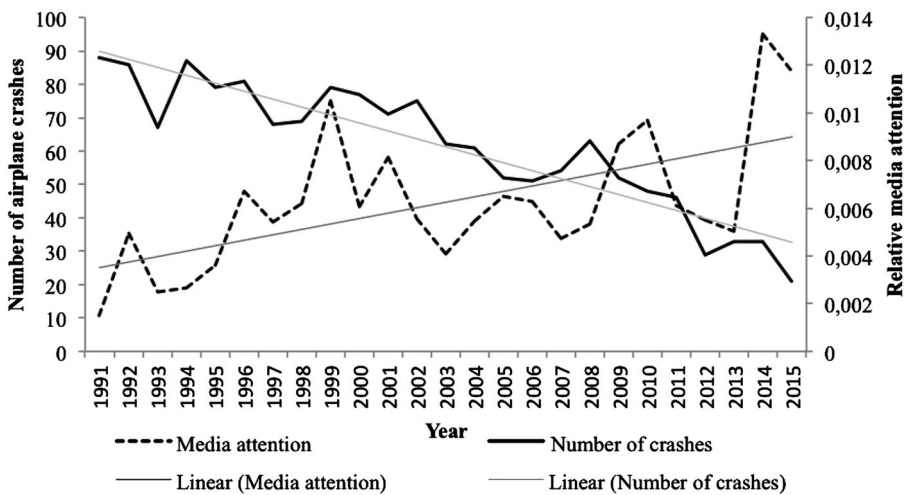


FIGURE 1
Overtime change in media attention for aviation incidents and actual aviation incidents

line is observed for the real-world data on number of aviation incidents. These findings indicate support for hypothesis 1.

We now proceed to our analyses attempting to explain the *effects* of media's attention for negative incidents. Specifically, to explore if media attention for aviation incidents is negatively associated with public responses in terms of air travel behavior (H2), we draw on Autoregressive Integrated Moving Average (ARIMA) time series techniques on a monthly level. This type of analysis offers the opportunity to answer questions relating to causes and effects of media attention by relying on aggregate-level time series data. The main idea of analyses like ARIMA is that the own past of a time series contains information that, at least partly, explains its current value and, therefore, it is important to build a model that is based on the series' own past before adding explanatory variables. Therefore, this type of modeling takes into account a series past values to predict present values, both autoregressive orders (AR)—i.e. influence of previous values—and moving averages (MA)—i.e. influence of residuals from previous values. Before the endogenous explanatory variables can be considered and the model can be tested, some steps need to be taken (Vliegenthart 2013). First, to test if the dependent time series—i.e. air travel behavior—in the model is stationary, a Dickey–Fuller test was conducted. Results showed that the dependent series were stationary. Second, the autocorrelation and partial autocorrelation functions suggest an AR at lag 1, 9, 12, and 13 and an MA at lag 1. The residual statistics indicate no significant autocorrelation in the residuals (Ljung-Box Q). Next, the model was expanded with the explanatory variables media attention at lag 0 and 1 as well as actual aviation incidents at lag 0 and 1, controlling for months. After adding these exogenous variables to the model, the Ljung-Box Q test is still non-significant, indicating that the residuals of the models consist of white noise. For more details on time series analyses in the context of media coverage, Vliegenthart (2013) offers a practically oriented overview of how to conduct this type of time series analyses.

The results of the ARIMA model can be found in Table 1. The analysis suggests an effect of media attention at lag 0 on air travel behavior, whereas no significant effect of total number of actual aviation incidents was found. Thus, the number of passengers boarding a plane is negatively associated with the volume of media attention for aviation incidents in that same month while there is no association with real-world data on number of aviation incidents. These outcomes support hypothesis 2.

To provide a first exploration of the question if news media coverage of aviation incidents increasingly contains facets of mediatization (RQ1), the results of the automated content analyses are discussed. After the inspection of the data, three periods were distinguished that each start with a drop in media attention, followed by an increase (see Figure 1). More specifically, the following timeframe were identified: Period 1, 1991–1999; Period 2, 2000–2010; Period 3, 2011–2015. Each period consists of multiple years of news coverage, which is enough to provide a thorough description of the data, yet gives us the opportunity to map variation across time frames.

Table 2 details the different topics or frames that were found with the combined cluster analysis for the three separate periods. When inspecting the topic labels for the different periods, a picture evolves in line with the expectation that news coverage increasingly contains mediatization facets. The first noticeable observation is that, in the first period, coverage on aviation incidents is predominantly covered in terms of technical safety. The dominant cluster is formed by subtopics as “safety rules” (formed by words such as air traffic, safety rules, aviation) and “technical investigation” (e.g. investigation,

TABLE 1

ARIMA estimation of the effect of relative media coverage on aviation incidents and absolute number of aviation incidents on air travel behavior, 1991–2015

	Lags	Coeff.	z-Value	p-Value
Relative media attention	0	−9367833	−2.56	0.010
Relative media attention	1	538559.9	0.17	0.866
Total number of crashes	0	−273.0468	−0.96	0.336
Total number of crashes	1	151.9947	0.54	0.592
January		−107748.9	−1.99	0.047
February		−195687.4	−2.89	0.004
March		388550.1	5.11	0.000
April		658532.6	9.25	0.000
May		1172556	15.12	0.000
June		1129314	11.05	0.000
July		1680703	17.97	0.000
August		1617422	17.92	0.000
September		1220418	14.69	0.000
October		1103076	15.19	0.000
November		121618.9	2.06	0.039
Constant		3573699	2.88	0.004
AR	1	0.9328141	21.98	0.000
AR	9	0.1462241	3.41	0.001
AR	12	0.1380436	2.36	0.018
AR	13	−0.2205788	−3.28	0.001
MA	1	−0.2596897	−2.96	0.003

landing, plane, technical errors). This cluster, just like the second most common cluster in period one, the jurisdictional frame, is a more technical way of describing aviation incidents and seems there with less subjective to media logic. Hints of mediatised coverage are already more prominent in the second period. The dominant victim cluster, formed by sub-topics as “fatalities” (e.g. passengers, deceased, pilot, loved-ones, tragic) and “exemplars” (e.g. people, short-life, hell, women), already links more closely to journalistic processes of bringing a human face or an emotional angle to the presentation of the incidents by highlighting the human-interest aspect—considered a facet of mediatisation. Especially in the last periods, signs of mediatisation can be observed. The political conflict (subtopics as: “internal politics” (e.g. international, politics, conflict, convention, regulation) and

TABLE 2

Identified clusters in the three periods

Period 1 (1991–1999)	Period 2 (2000–2010)	Period 3 (2011–2015)
1. Technical safety frame (96.3%)	1. Victim frame (88.3%)	1. Political conflict frame (90.57%)
2. Jurisdictional frame (1.8%)	2. Technical cause frame (6.52%)	2. Societal consequences frame (4.58%)
3. Product solution frame (1.7%)	3. International relation frame (3.49%)	3. Victim frame (4.34%)
4. Victim frame (0.17%)	4. Political frame (1.66%)	4. Prevention frame (0.47%)
5. Political frame (0.04%)	5. Terrorism frame (0.02%)	5. Aftermath frame (0.04%)

“political conflict” (e.g. rebels, tribunal, army, criminal court)), societal consequences (sub-topics as: “fear of flying” (e.g. fear, investigation, victim, death)), and victim (subtopics as: “safety” (e.g. victims, safety, people landing)) clusters relate to mediatization facets such as conflict framing, sensationalism of news, and human-interest framing. Frames like political conflict, societal consequences, and victim could also be seen as rather traditional framing practices within journalism instead of increasing mediatization processes. Yet, the increasing prominence of these type of frames, especially in comparison with the first phase, might be a first indication of an over-time change in media logic towards more negative oriented and sensational news framing to attract a large audience.

Conclusion and Discussion

The purpose of this study was to map the longitudinal process of media attention to and coverage of negative incidents and evaluate to what extent this reflects real-world trends and affects public responses. Media attention for aviation incidents is used to provide a longitudinal and systematic investigation into the trends of media attention related to real-world data, the effect on actual behavior, and the over-time change in coverage of these incidents.

The first goal was to examine whether media attention for negative incidents (i.e. aviation incidents) follows a different over-time trend as compared to real-world indicators. Results showed that trends in media attention and real-world developments deviated for the last 24 years. While the total number of aviation incidents went down over the years—as a result of today’s advanced aeronautical technology—we saw a rising linear trend for relative media attention for aviation incidents. So, despite air travel becoming safer, the media increasingly report on isolated and infrequent incidents, turning these negative incidents into a common societal image (Altheide 1997; Lawrence and Mueller 2003; Park et al. 2009). This finding provokes the claim that journalists are not always strictly guided by actual trends and long-term statistics. The observed discrepancies between real-world indicators and how media portray it signals that, at times, news develops a life of its own and that the complex process of news selection and production is partly guided by other factors than reality.

The second aim was to test if media attention for negative incidents (i.e. aviation incidents) can actually have negative behavioral consequences (i.e. air travel behavior). Times-series analysis showed that shifts in public behavior were negatively associated with media attention in the same month, whereas real-world statistics on aviation incidents did not seem to explain variation in air travel behavior. This finding is in line with previous research which demonstrates that media coverage, rather than real-world figures, drives public responses (Boomgaarden and Vliegenthart 2009; Van Klingeren et al. 2014). Causal inferences ought to be made with some tentativeness as no lagged effects were found. Yet, studies in the transportation field (Bosch, Eckard, and Singal 1998; Borenstein and Zimmerman 1988; Chalk 1987; Karels 1989; Mitchell and Maloney 1989) suggest that decreases in measures close to the air travel behavior (e.g. carrier’s stock rating or revenue in passenger miles) should be expected immediately after occurrence. Moreover, while a lagged association between attention and public response is desirable, a synchronous relation may be indicative of a causal impact since reverse causation is less likely. Thus, the public’s reactions to aviation risks seem to be primarily driven by processes of social construction and amplification of aviation incidents covered in the news media, rather than by the

real distribution of these incidents. Ergo, media seem to be a major player in risk debates if it comes to air travel behavior (Romantan 2005). It is striking that real-world statistics are seemingly irrelevant for public reactions; apparently, media reality, or media induced fear, is a stronger predictor for how the public understands the world and behaves accordingly as compared to reality itself. Furthermore, from a methodological perspective, these results contribute to the media effects literature, where longitudinal evidence about the causal impact of media attention on aggregate-level behavioral response is relatively limited.

The final objective of this study was to provide a first exploration of whether news coverage of negative incidents increasingly contains facets of mediatization. By dividing the longitudinal data into three distinct periods, the automated content analysis indicated that aviation incidents are increasingly discussed in a mediatized manner. Apparently, media logic could dictate how media and journalists write about negative incidents and can potentially explain the rising trend in attention for this type of news. So far, research mainly suggested that, with the rise of mediatization, stories and events get framed in a certain way by news media (Magin 2015). The findings of this study suggest that the rising prominence of media logic is also accompanied by the increased attention for certain negative news, even disproportional attention compared to real-world data.

Mediatization might not only explain journalistic selection processes and the increased attention for negative incidents, it could potentially also explain media effects. Thus, media logic might exercise influence on other social systems such as patterns in the use of aviation products by the public. If news on negative incidents is increasingly covered in a personalized and sensational way, the news might become more appealing and lively for the audience. As a consequence, negative news becomes news that individuals can easily sympathize and identify with. As this portrayed media reality comes closer to audiences, peoples' perception and behavior might become more susceptible to media effects.

From a normative perspective, the observed disproportional attention for negative incidents and the behavioral consequences could make us wonder if we should actually turn away from the news as news and reality do not necessarily align. At some point, media seem to have a blind spot for progression, where uncommon incidents are chosen over reportage on structural progression. This relates to the notion that journalists have the tendency to rely on exemplar information or episodic framing in their reportage rather than base-rate information or thematic framing (Gibson and Zillmann 1994; Gilliam and Iyengar 2000). Base-rates are said to be less illustrative or vivid than exemplar information. Yet, exemplars might result in perceptual or distortion bias such as negative stereotypes or overestimation of the frequency of incidents (e.g. Sherman 1996; Entman 1991) as it is seldom presented in a systematic manner (Gibson and Zillmann 1994). Therefore, one might argue that media logic and news values should not always be leading in the journalistic process of news selection and reportage to avoid that the truth suffers a considerable distortion where the complex is made over into the simple and the relative into the absolute (Lippmann 1955).

Several shortcomings in the study need to be acknowledged. First, this study was limited to the inclusion of Dutch media attention for aviation incidents. Therefore, the results cannot be generalized to coverage on other negative incidents or negative news in general. Future research should explore if comparable patterns of how media coverage reflects real-world statistics can be found for the occurrence of other negative incidents,

also in media coverage of other countries. Consequently, certain events can play a key role in the data analysis. Therewith, it needs to be noted that in 2014 an airliner with 298 passengers (68% were Dutch) and crew was downed flying over eastern Ukraine, potentially explain why media attention spiked in 2014. As this incident could be considered an outlier, it is questionable if the results of the final phase of analysis say much about the mediatization of overall news coverage on aviation incidents. Second, the inductive automated content analysis had its limitations. Ultimately, over time increase of topics that could be related to facets of mediatization would have been analyzed. However, this inductive and exploratory computational method did not provide clear trends in the over time presence of topics. Further research should rely on manual coding, optional in combination with machine-learning techniques, to obtain a more detailed understanding of which facets become more prominent over time. In doing so, future research can contribute to the over-time investigation of the concept, as mediatization literature is strong on conceptual discussions and theoretical perspectives but lacks in empirical research (Strömbäck and Esser 2014; Van Aelst et al. 2014). This would also allow correlating style of media coverage, in terms of the presence of mediatization facets, to public responses. Nevertheless, by splitting the data into three time periods, this study provides a solid first exploration of the mediatization of negative news.

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