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New perspective? Comparing frame occurrence in online and traditional news media reporting on Europe's "Migration Crisis"

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Abstract: News media have transformed over the last decades, there being increasing numbers of online news suppliers and an increase in online news consumption. We examine how reporting on immigration differs between popular German online and print media over three crucial years of the so-called immigration crisis from 2015 to 2017. This study extends knowledge on the framing of the crisis by examining a period covering the start, peak, and time after the intake of refugees. Moreover, we establish whether online and print reporting differs in terms of both frame occurrence and variability. The period of the crisis provided an ideal test to see whether the focus of media reporting differed between online and print sources. Employing a most-similar-cases design based on (autonomous) online and print versions of three major German news outlets, we extract the dominant frames in almost 18,500 articles using algorithm-based topic modelling. While results indicate that many frames are more visible in either online or print media, these differences often do not follow theoretical expectations. Furthermore, online media are dominated by particular frames and, hence, show less diversity than print media. However, important key events happening during our period of investigation do not affect overall diversity of frames.

Keywords: immigration, mass media, online, print, framing, Germany, migrant crisis, refugees

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1 Introduction

In the last two decades, news media have transformed, giving rise to online news content provided by online-only sources as well as online versions of print outlets. News content nowadays comes from a much wider range of sources through news aggregators and via social media compared to times of dominant print and television news (Lee and Chyi, 2015). Yet, has news content also become more diverse in an age of increased availability via online news or not?

News consumption on online devices has increased and changed behavior, especially for younger consumers (Bakker, 2013; Boumans, Trilling, Vliegenthart, and Boomgaarden, 2018). Due to online availability of a large variety of news, many people now “snack” and “graze” (Molyneux, 2018) from several news sources. The myth that people who read their news online are only exposed to like-minded topics and viewpoint through filter bubbles has been debunked (Zuiderveen Borgesius et al., 2016). Allegedly, however, online news consumption can still create a new type of ‘bubble’ due to a more limited range of exposure in terms of frame variety, as the content of online news outlets relies more heavily on the same news agencies (Boumans et al., 2018). The comparison of the content of online versus print news has received little scholarly attention (Dimitrova and Strömbäck, 2009; Reich, 2016), which is particularly true regarding the comparison of differences in the usage of frames. We aim to fill this lacuna by examining *which frames appeared during the German immigration crisis and did they appear similarly in online and print news?*

Online news media have the potential to differ from their print counterparts in terms of length, sheer number of articles (Jacobi, Kleinen-von Königslöw, and Ruigrok, 2016), and content. The overarching concepts of convergence, immediacy, and interactivity (Karlsson and Strömbäck, 2010) cause online media to be more flexible but leave journalists with less time for fact-checking and reflection. Consequently, online journalism becomes more reliant on news agencies (Boumans et al., 2018) and imitation (Buhl, Günther, and Quandt, 2016). Does this reduce the variety in content and applied frames?

Despite these differences, academics interested in longitudinal news media (effects) have mainly turned to print sources, which then function as a proxy for news media content as a whole (see e. g., Boomgaarden and Vliegenthart, 2007; Czymara and Dochow, 2018; van Klingerén, Boomgaarden, Vliegenthart, and De Vreese, 2015). Whether this assumption is unproblematic remains so far unanswered. Furthermore, since mostly younger people use online sources for their news consumption (Mitchelstein and Boczkowski, 2010; Trilling and Schoenbach, 2015), any differences between online and print media potentially lead to a generation gap in perceptions based on news media

content. It is therefore important to know more about the content of these news media.

To study news framing in online and print media, we rely on articles published in Germany during the European immigration crisis from January 2015 to December 2017. It is especially during crises that news media play a vital role in getting information across. Their coverage provides a signaling function for key events (Czymara and Schmidt-Catran, 2017); their patterns in terms of frames, topics, and connotations can affect public discourse and attitudes towards the issue (Boomgaarden and Vliegenthart, 2007; Meeusen and Jacobs, 2017; Trilling, van Klingeren, and Tsfati, 2016; van Klingeren et al., 2015; van Klingeren, Boomgaarden and de Vreese, 2017; Meltzer et al., 2020). We selected this particular period because media tend to reinvent themselves during crises. The unexpected nature of crises disrupts normal news-making routines and creates an opening for the creation and formation of new perspectives and frames (Schultz, Kleinnijenhuis, Oegema, Utz, and van Atteveldt, 2012; Snow, Vliegenthart, and Corrigan-Brown, 2007). The question is, however, whether this happens similarly in online and in print media.

Greussing and Boomgaarden (2017) studied the developments of frames in Austrian media during the first year of the crisis (i.e., 2015), while Heidenreich, Lind, Eberl, and Boomgaarden (2019) investigated framing of the crisis across five countries over the first two years. We contribute to this literature by investigating framing in Germany, one of the main political players of the European immigration crisis (Czymara, 2020; Heizmann and Ziller, 2020), over the complete three-year time span, also covering the time after the initial peak of refugee inflow. Furthermore, we exceed existing knowledge by moving beyond sole descriptive analyses, as we theorize and apply the trilogy of online media characteristics' *immediacy*, *interactivity*, and *convergence* (Karlsson and Strömbäck, 2010) to derive expectations.

We compare the content of articles on the immigration crisis of the online and print versions of three major German newspapers and news magazines, namely, *Die Zeit*, *Der Spiegel*, and *Die Welt*. All three outlets have autonomous online output, making them an ideal most-similar-cases design. The selection of different publishing formats of the same news outlets yields a systematic but also conservative comparison. After discussing theoretical expectations and introducing the German case and our six outlets, we *identify the frames that were present during the period of investigation*. We use topic modeling, an inductive machine-learning approach, for our content analysis. Subsequently, we examine whether there are *structural differences in the presence and variety of the frames between online and print media*. This relates to differences in the frames' overall salience but also to differences in their development over time as well as the diversity of frame usage.

Immigration discourses in mass media

Framing literature provides many definitions of the concept. With the application of automated content analysis, discussion arises on whether frames can be measured automatically (see, e.g., van der Meer, Verhoeven, Beentjes, and Vliegenthart, 2016). Automated content analyses usually do not capture aspects like nuance, irony, pictures, or references. However, one can establish the ‘sauce’ that is poured onto an issue. The definition applied in this study therefore interprets frames as a certain angle, formed by means of selection and choice of words, or by zooming in on a specific part of an issue (Tewksbury and Scheufele, 2007).

Prior research suggests that frame usage in immigration news is highly dependent on immigrant group, news outlet, and context (see, e.g., Heidenreich et al., 2019; Jacobs, Meeusen, and D’Haenens, 2018; Kroon, Trilling, Van Selm, and Vliegenthart, 2019; Lind and Meltzer, 2020; Wallace, 2018). Yet, several overarching frame-clusters reoccur. These are *victimization* frames (Van Gorp, 2005), which focus on refugees as being victims of circumstances and their need for help. Second, *problematising* frames (Bennett, Ter Wal, Lipinski, Fabiszak, and Krzyzanowski, 2013; Goodman and Speer, 2007; Horsti, 2007) cover aspects like crime, terrorism, or illegality. Third, there are the *economic* consequences of a migration frame (Madra and Adaman, 2014; Quinsaat, 2013). This can include consequences for local economies or the welfare state. *Dehumanization* frames (Esser and Matthes, 2013) describe the magnitude of the arriving group and the powerlessness related to their arrival; they also relate to a we/them perspective and thus often have a polarizing nature.

Crises are interesting times regarding frame formation, as they mostly happen unexpectedly and disrupt normal routines in the creation of news, fade norms, and affect policy formation. They create an opening for new interpretations to take shape. In news media, this often results in a wide range of old and new frames at the very beginning of a crisis, which crystalizes as time passes (Schultz et al., 2012; Snow et al., 2007). Since the refugee crisis is an uncommon event, prior studies examining media reporting on refugees in other European countries also found frames which are more specifically molded to the political-historical context, such as *settlement*, *border situation*, *refugee accommodation*, *refugee movement*, and *unaccompanied children* (Greussing and Boomgaarden, 2017; Heidenreich et al., 2019). Following the lead of these previous scholars, we use an exploratory method to establish frames in our analyses. Our first research question is:

RQ1: Which frames appeared during the German immigration crisis, and how did they develop?

Different frame occurrence in print and online news media

One might assume that the general content of print news and their online counterparts is highly similar, as they influence one another (Welbers, van Atteveldt, Kleinnijenhuis, Ruigrok, and Schaper, 2016). However, their content may also differ because of the differences in functionalities and possibilities. The news market has become increasingly competitive through the widespread availability of news. This has triggered a move from craft norms towards a serving of the marketplace (McManus, 1995). Online media make it particularly easy to observe audience behavior. In craving people's attention, analytics of clicks and views play a central role in daily journalism (Welbers et al., 2016), affecting editorial decisions with regard to newsworthiness and article position (Lee, Lewis, and Powers, 2014). Consequently, online news is often seen as more flexible and responsive than traditional news.

Karlsson and Strömbäck (2010) provide one of the most comprehensive definitions of online news. They describe it as 1) *interactive*, which may affect text and content as well as user-behavior (e.g., Cover, 2006; Ksiazek, Peer, and Lessard, 2016). Steuer (1992) described interactivity as “the extent to which users can participate in modifying the form and content of a mediated environment in real time” (p. 84). This includes ‘read more’ buttons, response boxes and other ways to co-create news messages but also to adjust the headlines to attract attention most, and to adjust content to viewer behavior; 2) *convergent*, given that news websites can merge several elements of traditional media together (see Marshall and Burnett, 2003), transforming them into a multi-media platform; and 3) *immediate*, as information is posted promptly online. The question is, however, how these characteristics of online news affect its content, or more specifically:

RQ2: How do aspects of interactivity, convergence, and immediacy affect frame usage, and (how) does online news differ from print news on the immigration crisis?

Because news is increasingly tailored to what sells, we argue – given the opportunities to attract new audiences and bring in/out information when it is still ‘fresh’ – that this competition is even fiercer online. The fact that news media are more *interactive* and rely for their audience on ‘clickbait’ captions and ‘need-to-know’ information, selecting the right terms (or frames) is essential in order to wheel them in. Online news can be made attractive in terms of excitement, by adding sensational elements to a story or headline (i.e., clickbait). While this can also be the case for print media, there is less direct competition and therefore less of a necessity. Sensationalism is often defined as the ability to increase attention or provoke arousing responses (see Grabe, Zhou, and Barnett, 2001), and has been related to feelings of sensation that occur in situations that are deemed dangerous for human

survival or reproduction (Davis and McLeod, 2003; Shoemaker, 1996). Given our argument that online news is more sensitive to competition, we hypothesize that:

- H1a) Online news applies sensationalist frames more often than their print counterparts,
H1b) whereas we expect no differences regarding other kinds of frames.*

Diversity of frame-usage

Convergence means that journalists are not confined to words and pictures printed on paper since they can connect a story to videos, audio, and livestreams (Greer and Mensing, 2006). Moreover, online audiences tend to want their information fast and are easily distracted by other news or online activities (Neuberger, Nuernbergk, and Rischke, 2007). This means that stories might be shorter, and the message needs to be clear and concise. Consequentially, there should be less space for elaborate framing in *online* news articles.

The fact that online news is more *immediate* is bound to affect the diversity of its content. Journalists may rely more heavily on known structures and information because there is less time to investigate alternative perspectives. Immediacy can also cause online journalism to rely more heavily on unaltered texts provided by news agencies (Boumans et al., 2018). Overall, diversity in perspectives is pressured under time constraints, and journalists might rely more on the *interactive* component of the medium, such as comments and user, to add nuance to a story. We hypothesize that:

- H2: Online news provides a less diverse selection of frames than print news does.*

Research on framing during crises has shown a broadening of perspectives around the ‘climax’ of a crisis, followed by a period of ‘frame crystallization’ during which few frames dominate (Schultz et al., 2012; Snow et al., 2007). We argue that the immigration crisis consisted of several important events, or climaxes, that may have triggered a similar response. As these events affect both online and print newsrooms, they have the potential to cause a high level of diversity in both types of news sources, thereby making online and print news outlets more alike in this respect.

However, given that online news attains higher levels of immediacy, another option is that online news is less flexible. Time-constraints play an even bigger role around key events, when every source wants to be the first to present latest scoop. This could lead to diversity being a time-consuming luxury that only print news can afford (Reich, 2016). Diversity in content and framing may hence dimin-

ish in online news during key events (Buhl, Günther, and Quandt, 2016). These opposing perspectives lead to the following two hypotheses:

H3a: Key-events generally spark greater diversity in frame usage, and this is similarly true for both online and print media.

H3b: Key-events spark greater diversity in frame usage in print news compared to online news articles, thereby increasing differences between both.

2 Data and methodology

The case

Germany fulfilled a leading role within Europe during the crisis but held a somewhat ambiguous position towards the admittance of refugees as the crisis developed (Holmes and Castañeda, 2016). During the refugee peak in 2015, Germany received more refugees in absolute terms than any other country in Europe (Czymara, 2020; Heizmann and Ziller, 2020). The increase in asylum rates was also accompanied by a sharp increase in anti-immigrant violence (Jäckle and König, 2017), which led to political discussions over how to process and allocate the growing number of refugees entering Germany. This clash of the country's moral heritage combined with modern-day anti-immigrant sentiment is reflected in its everyday discourse and contemporary policies, making it ever more relevant to see how media deals with this issue.

Design

We employ a most-similar-cases design, comparing online and print versions of *the same outlets* (but with independent editorials, see below). Since this design allows us to hold other outlet-specific characteristics such as ideologies or political leanings constant, differences we find are more likely caused by the online/print characteristic. However, one should keep in mind that this leads to a conservative estimate of potential online/print differences.

We draw upon articles of the largest weekly news magazine in Germany, *Der Spiegel*,¹ and the largest weekly newspaper, *Die Zeit*, as well as of Germany's

¹ <https://de.statista.com/statistik/daten/studie/164386/umfrage/verkaufte-auflagen-von-spiegel-stern-und-focus/>

fourth largest daily newspaper, *Die Welt*.² While *Die Welt* is often considered more conservative, *Die Zeit* and *Der Spiegel* are typically regarded center-liberal. In combination, they represent a relatively wide spectrum of German quality news. Crucial for our study is that all three outlets maintain websites with autonomous online editorial boards (Zeit Online and Spiegel Online) or an autonomous online editorial board editor-in-chief (Welt Online).³ We, thus, assume that workflows and practices are (sufficiently) autonomous from their print editorial, rendering comparisons meaningful. Furthermore, all websites have many millions of visitors per month.⁴ Yet, the outlets' websites also publish selected articles from the respective print version, which we address below. For a more specific description of the data, see Table A1 in Appendix A.

Data collection, preparation, and analysis⁵

We collected articles published between 1, January 2015 and December 31, 2017 from LexisNexis, which included either terms related to refugees or asylum at least twice.⁶ This results in an initial dataset of 32,597 articles. To remove articles that were published both online and in print, we identified duplicates that were highly similar (at least 95 % overlap), published in the same year.⁷ To remove articles only loosely related to the migrant crisis or not all at, we dropped those from sections that were evidently irrelevant, such as sports, cinema, or the US election. Moreover, we calculated the ratio of the number of search term occurrences to article length for each article and deleted those articles in the lowest ten percent

² <https://de.statista.com/statistik/daten/studie/73448/umfrage/auflage-der-ueberregionalen-tageszeitungen/>

³ <https://www.zeit.de/impressum/index>
<http://www.spiegel.de/impressum/a-941280.html>
<https://www.welt.de/services/article7893735/Impressum.html>

⁴ <https://de.statista.com/statistik/daten/studie/154154/umfrage/anzahl-der-visits-von-nach-richtenportalen/>

⁵ All code is available at <https://dx.doi.org/10.17605/OSF.IO/ETG5H>

⁶ Search string: ATLEAST2(!flüchtling!) OR ATLEAST2(!asyl!)

⁷ Using unique articles makes the comparison cleaner but could also lead to a distortion of the results. We used Gruber (2019) for the data import and for detecting duplicates. We always deleted the second occurrence of articles. The 2,440 duplicates are significantly more common online (19 % of all online articles) than print (0.5 % of all print articles). To ensure that selective deleting does not have an impact on our results, we re-estimated our models without deleting any duplicates. Not only were we able to identify the same frames (see Table B5 in appendix B), but the overall patterns in differences between print and online across frames were also largely the same (see Figure B3 in appendix B).

of this score. We reduced dimensionality by deleting stop words, terms occurring in more than a fifth or less than 0.1% of all articles⁸, and non-letter characters and stemmed terms, using Benoit et al. (2018). This leaves us with a final dataset of 18,441 unique articles and 15,957 terms.⁹

We use the Structural Topic Modelling (STM) approach of R's *stm*-package by Roberts et al. (2014) to identify frames in our text data. STM is an unsupervised machine-learning method that identifies dominant word clusters (our frames) in the data without a-priori restrictions, relying on the bag-of-words assumption that each term in a text contributes to its meaning independent of its position (Boumans and Trilling, 2016). Thus, *we define a frame as a cluster of words that represents a latent theme*. STM determines how one set of frames is distributed across the articles. Articles in our data most likely consist of various frames, some of them directly related to migration and refugees (for example, on asylum numbers) and others not (for example, national elections). Topic modelling is especially suited for the analysis of newspaper articles, where texts typically include several frames (Grimmer and Stewart, 2013, p. 272). In an iterative process, STM yields a posterior probability distribution of the *salience* (i.e., proportion or presence) of each frame per article, which is our main interest. The probabilities of all frames to belong to an article sum up to one, meaning that frames are interdependent. A crucial benefit of the STM package for our purpose is the possibility to include covariates on the document level into the analysis (Roberts et al., 2014). We model frame salience as a function of an *online vs. print-dummy*, the *date of publication* (as a spline) as well as the *interaction of both*. Hence, we allow frame salience to generally vary between online and print media, and also to follow different trends in online and print media over time.

We opted for a model with 20 frames because we are interested in differences in broader themes. From these 20 frames, we focus on 14 selected frames, as upon closer examination, some of the found frames were applied to other issues discussed in the articles (the full set of frames is shown in Table B2 in Appendix B).

⁸ Often or rarely used terms do not differentiate well between the different frames. Removing these terms enables better identification of meaningful structures or frames in the text.

⁹ For each outlet, we calculated the share of relevant articles (precision score) based on a 3% random sample. We defined articles as relevant if they relate to the immigration crisis, its causes, or consequences. These scores are reasonably high, although not perfect for all cases, ranging from 0.76 to 0.91 (see Table 1). We have no reason to assume that the noise in our data is systematic. Hence, it should have little influence on our results.

Key events

Key events relate to important situations in Germany and abroad that are linked to refugees (see Appendix A for the complete list). We use a dichotomous variable to distinguish the period up to a week after a key event from other periods.

3 Results

Descriptive results

Figure 1 displays the total number of articles for all outlets. Reporting on the issue sharply increased in fall 2015, which was when the number of arriving refugees increased and when the issue became salient (see Czymara and Dochow, 2018). The number of monthly articles increased fourfold from July to September 2015 (print: from about 100 to about 400; online: from 200 to over 800). Another peak in January 2016 relates to the sexual assaults in Cologne on New Year's Eve, which many connected directly to the inflows of refugees (Frey 2020; Czymara and Schmidt-Catran, 2017). By spring 2016, media attention on the issue declined again, which suggests a normalization of the issue.

Although the issue was politicized, there were no major events that sparked an increase in media attention until December 2016, right after the Islamist terror attack in Germany with the highest number of casualties up to date (Fischer-Preßler, Schwemmer, and Fischbach, 2019; Schmidt-Catran and Czymara, 2020). A final peak in September 2017 relates to the German parliamentary elections, in which immigration and border policies were among the most dominant topics. Although the article numbers were always higher for online news for structural reasons (two of three print outlets are released weekly), similar trends show in online and print media.

Refugee and migration frames in German media

The relevant frames are presented in Table 1, which shows the terms with the highest probability of being in each frame in descending order. Various frames relate to problems associated with the intake of refugees: *crime*, *terrorism*, *religious conflict*, and *fear*.¹⁰ While crime or security frames are usually identified

¹⁰ Correlations between frames are shown in Table B1 in Appendix B.

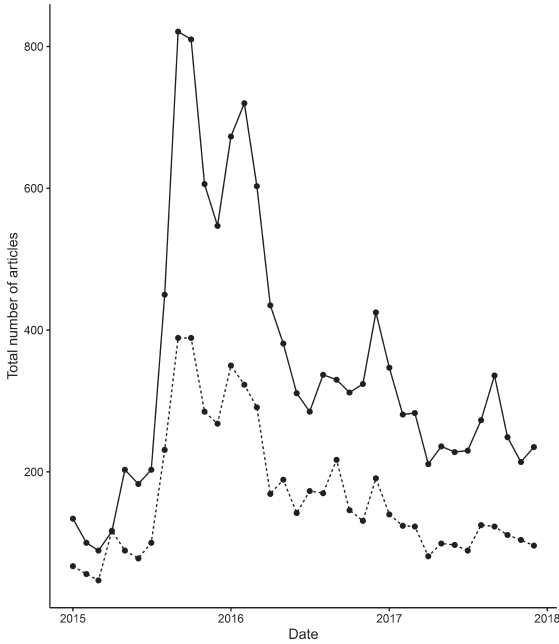


Figure 1: Reporting on immigration in German media.

in prior content analyses of media articles about immigration (e.g., Greussing and Boomgaarden, 2017; Kluknavská, Bernhard, and Boomgaarden, 2019; Kovář, 2019), we distinguish a terrorism frame from a frame more broadly connected to crime. The *terrorism* frame primarily deals with particular attacks, most prominently the assaults on New Year’s Eve 2015/16 in Cologne and the attack on a Christmas market in Berlin in 2016. In contrast, the *crime* frame includes more general crime-related issues such as injury, arson, or murder. The *fear* and the *religious conflict* frames capture consequences and possible problems related to the refugee inflow on a more abstract level. *Fear* captures emotional and negative terms such as *problem*, *crisis*, and *danger*, related mostly to larger social and political concepts such as *society*, *democracy*, or *freedom*. Among the articles with the highest probability to belong to the *fear* frame are articles dealing with discomfort with globalization and immigration, fatalism, or moral issues. Thus, *fear* can be regarded a *problematizing* frame although it connects less to particular crimes or violence (Bennett et al., 2013; Goodman and Speer, 2007; Horsti, 2007). Moreover, *fear* is the most dominant of our main frames, being the primary frame of about eight percent of articles. This points to the general uncertainty and “crisis character” in our analyzed media.

The *religious conflict* frame deals with ethnic and religious conflicts and resulting refugee flows from a more global perspective, often with a particular emphasis on Muslims (see Czymara, 2019). Articles here deal with situations in, for example, Jordan, Turkey, Pakistan, or Myanmar (e. g., “Poorer countries take in most refugees”).

There is also a frame that deals with violence of host society members: the *right-wing extremism* frame. This frame focuses on expressions of anti-immigrant protest and violence and the far right. It relates mostly to the PEGIDA protests, which peaked at the beginning of 2015, and attacks on refugee shelters in Saxony and other parts of Germany (Jäckle and König, 2017; Frey 2020). This is distinct from the *right-wing populism* frame, which relates to party politics and contains issues relating to Germany’s newly emerged right-wing populist party, the Alternative für Deutschland (AfD).

Other frames cover different stages of the flight process. The *Middle East war* frame discusses some of the main causes of refugee flows: the war in Syria and the Islamic State (IS). *Route*, *refugee crossing*, and *border* relate to flight and the entering of Europe. While *route* deals with intra-EU issues such as the allocation of refugees among its member states, *border* includes issues related to the outside border of Europe. The more specific *Turkey* frame relates to the deal the European Union made with Turkey in order to lower the number of refugees that flee over land through Turkey (BBC, 2016). *Refugee crossing* primarily deals with migrants trying to enter Europe, for example, by crossing the Mediterranean Sea. Many of the top articles of this frame deal with the death of those migrants or their rescue. The *accommodation* frame addresses one of the most urgent issues host societies must tackle after refugees have arrived: the provision of accommodation. Similarly, the *asylum* frame deals with practical and bureaucratic aspects which host societies face, including asylum procedures or deportation. These frames are similar to the *settlement* and *reception/distribution* frames identified by Greussing and Boomgaarden (2017) and the *accommodation*, *refugee camps*, *border*, or *refugee policies* frames by Heidenreich et al. (2019).

In line with previous research, we also find an *economy* frame that addresses issues like the integration of arriving refugees into the labor market (see Madra and Adaman, 2014; Quinsaat, 2013).

Table 1: Migration frames in German media.

Fear	Economy	Route	Turkey	Right-wing extremism	Crime	Refugee crossing
society	billion	Greek	Turkey	PEGIDA	police	Mediterranean
fear	economy	Greece	Turkish	Facebook	years	Italy
citizen	job	migrant	Erdogan	Dresden	investigation	Libya
democracy	integration	police	Ankara	Saxony	injured	boat
crisis	high	Macedonia	president	extreme right	prosecutor	migrant
problem	enterprise	authority	Turk	racist	suspicion	ship
creating	labor market	thousand	agreement	demonstration	presumed	coast
danger	money	Balkan route	Tayyip	media	old	Libyan
fact	school	islands	reception	xenophobic	stated	coast guard
value	job	succeeded	deal	Saxony	arrest	
Terrorism	Border	Accommodation	Asylum	Middle-East war	Religious conflict	Right-wing populism
attack	Greece	city	deportation	Syria	Muslim	Afd
Cologne	Commission	commune	asylum application	IS	child	survey
police	Brussels	accommodation	BAMF	Syrian	church	questioned
criminal offense	summit	flat	asylum	struggle	U.N.	choice
authority	Poland	Hamburg	Maizier	Islam	international	Petry
infringement	border	help	declined	al	Africa	majority
Islamist	together	Federal	federal government	Iraq	flight	Gauland
Tunisia	head of government	state	migration	Assad	Christian	attachment
attack	distributing	local community	federal Bureau	city	nation	point
terrorist	Italy		asylum procedure	soldier	violence	citizen

Note: Stemmed tokens translated with most likely meaning.

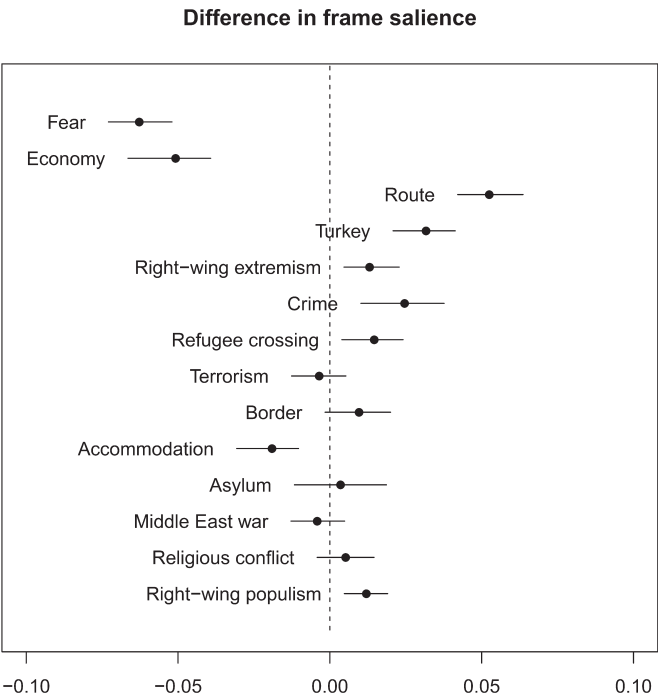


Figure 2: Differences in frame salience between online and print.

Frame occurrence in online and print media

We have argued that sensationalist frames should be more visible online than in print (H1a). Literature states that some frames have an inherent valence and, often implicitly, carry negative aspects (De Vreese and Boomgaarden, 2003). The same holds for sensational elements, which tend to converge with negative aspects within a single frame. Based on their content and top terms, we distinguish *fear*, *right-wing extremism*, *crime*, *terrorism*, and *Middle East war* as sensational. These are the frames most strongly connected to violence, safety, or threats to the social status quo.

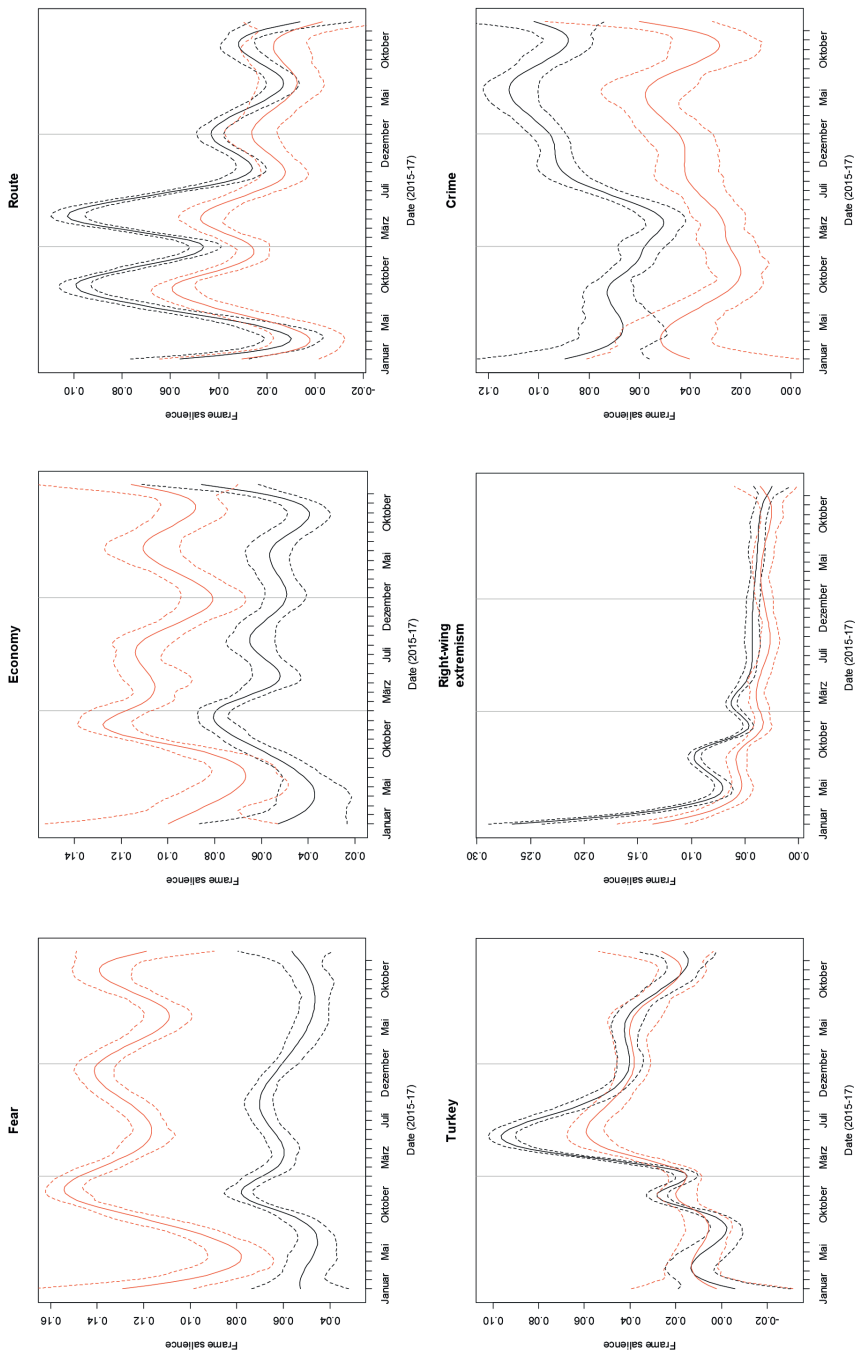
Figure 2 displays the differences in frame salience between online and print media.¹¹ In line with our theoretical expectations, *right-wing extremism* and *crime*

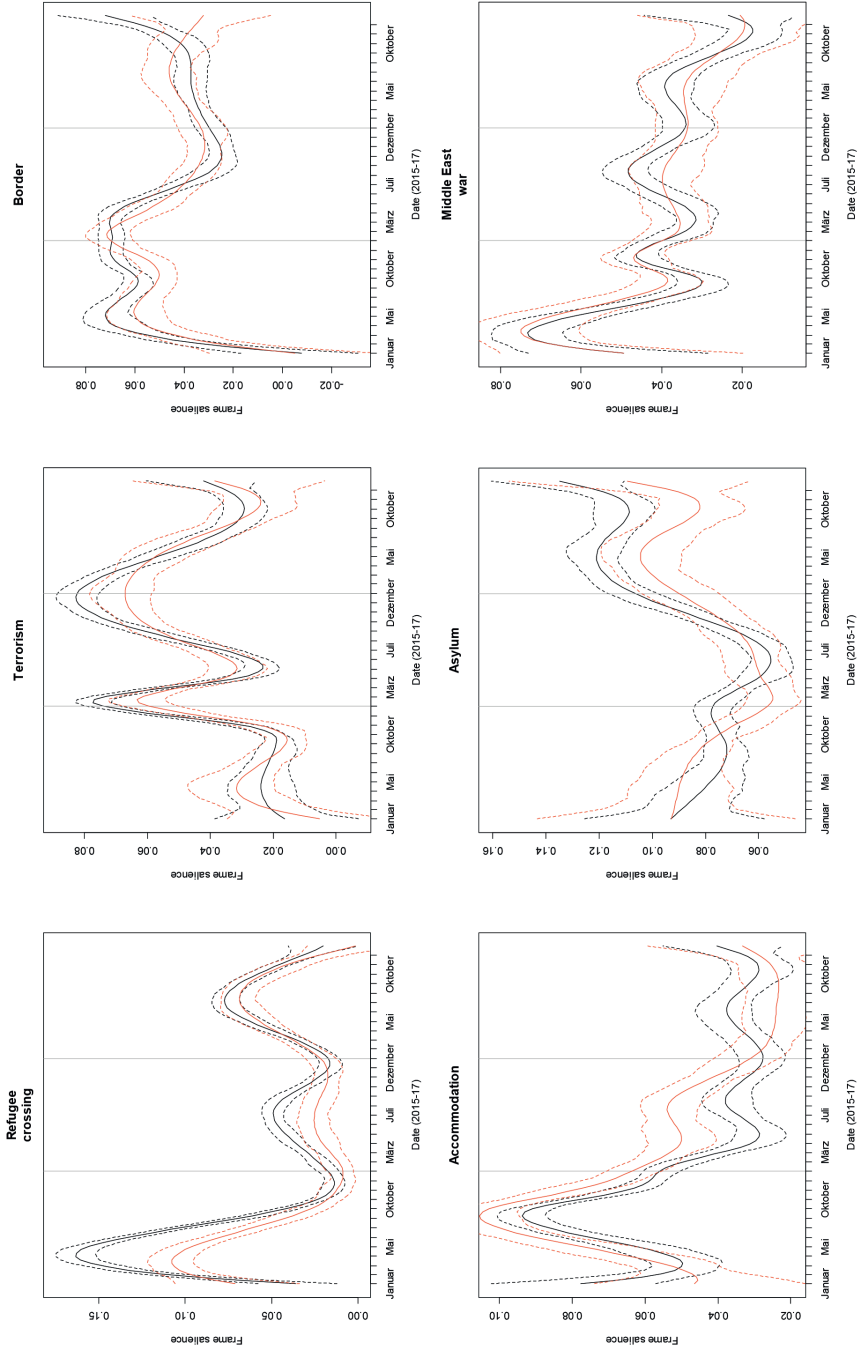
¹¹ As a robustness check, we also ran separate models that compare online and print within each outlet. The conclusions are largely similar, which can be seen in Figure B1 in Appendix B.

frames are indeed significantly more present online. However, there are, on average, no statistically significant differences in the occurrence of the *terrorism* and *Middle East war* frame. Contrary to our theoretical reasoning, the *fear* frame even occurs significantly more in print. Taken together, we find no systematic evidence in favor of Hypothesis 1a. Moreover, there are several differences we would not expect. For example, *economy* is clearly more visible in print media while *route* is more prominent online. These differences do not seem to follow a systematic theoretical pattern and can hardly be explained ad hoc. Interestingly, differences between online and print are more pronounced than differences across the three different outlets, as Figure B2 in Appendix B shows (see also Table B3). While this means that the differences between online and print media seem to capture more important patterns compared to differences between the three main outlets, these patterns are not in line with Hypothesis 1b.

Figure 3 shows time trends by plotting each frame's salience as a smooth function of time, distinguishing between online (black) and print (red) outlets. The different panels indicate how salient each frame was at a specific point in time for both kinds of outlet, with the y-axes showing the predicted probability for each frame to occur at a specific date. By and large, online and print show similar temporal patterns of reporting. Yet, there are some notable new insights. At the very beginning of the period investigated, which is *before* the major refugee intake but during the then popular anti-immigration PEGIDA protests, we see a dominance of the *right-wing extremism* frame. With a predicted probability of over 25 % in early 2015, this dominance is much stronger for online media than print, where this probability is below 15 % (see fifth panel of Figure 3). During the inflow in summer 2015, there were dozens of attacks on refugees and asylum shelters, which are also captured by the *right-wing extremism* frame. These developments were, again, considerably more prevalent in online media, as the peak of the black line in mid-2015 shows. From 2016 onwards, the salience of this frame converged for online and print, and thereafter remained at a lower level for both.

As the number of those trying to cross the Mediterranean Sea began to rise in the summer of 2015 (Eurostat, 2016), the focus of media reporting quickly shifted from the *extreme-right* frame to the *refugee crossing*, and to the *route* frame somewhat later. Regarding *refugee crossing*, online news peaks much more strongly in the early summer of 2015. Yet as the issue 'normalizes', the reporting on this frame converges and both outlets follow largely similar trends after fall 2015. The *route* frame is more visible in online news, but only in the summer of 2015 and spring 2016 (panel 3). The *asylum* frame gets considerable attention in 2017, which holds true for online and print. Similar to the findings of Greussing and Boomgaarden (2017), there is a rise in the *crime* frame, but this is again more the case for online media than for print. In contrast, the *terrorism* frame rises mostly during the





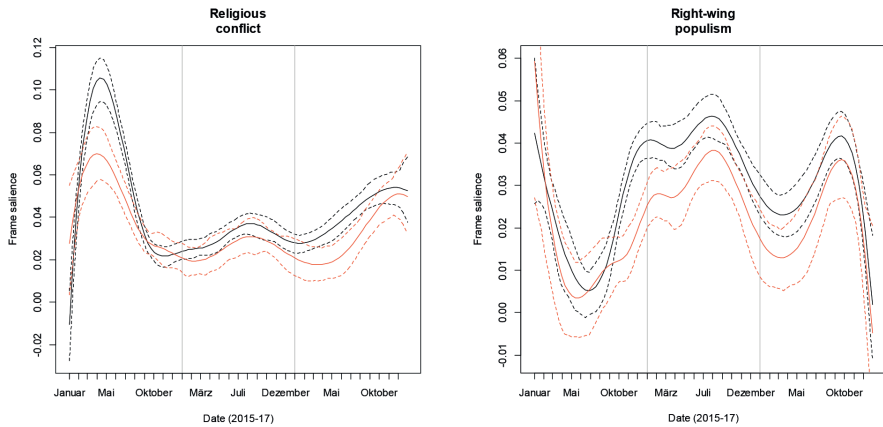


Figure 3: Trends of frame salience online and print.

Note: Black: online, red: print (plus 95 % confidence intervals).

sexual assaults of New Year's Eve 2015/16, and during the Berlin Christmas attack 2016. The peaks of *terrorism* occur similarly in online and print media.

Although these time trends do not follow our expected pattern, there are distinct differences between outlet types, and these differences sometimes change across time. This indicates that eventual frame exposure of outlet-divided audiences can differ substantially, making some aspects seem disproportionately more salient than others.

To see whether online and print frame usage follows the logic of key events, we ran a set of regressions, modeling the salience of each frame as a function of the online/print-dummy, the event dummy, and an interaction of both (full results in Table B4 in Appendix B). Figure 4 shows differences between online and print media in times of key events (event dummy held at 1, based on the *interaction* column in Table B4). Results suggest that online and print media do not differ more during key events (with the exception of the *route* frame).

Variability in media reporting in online and print

In order to test Hypotheses 2 and 3a/b, we generated a measure for the variety of frame usage in online and print media. To this end, we first calculated the distance of a frame's probability from the overall probability for all frames in each article. Subsequently, we generated the standard deviations of these distances for each frame. Finally, we compared the standard deviations of online with print news averaged per week. We subtracted these scores from 1 so that this measure

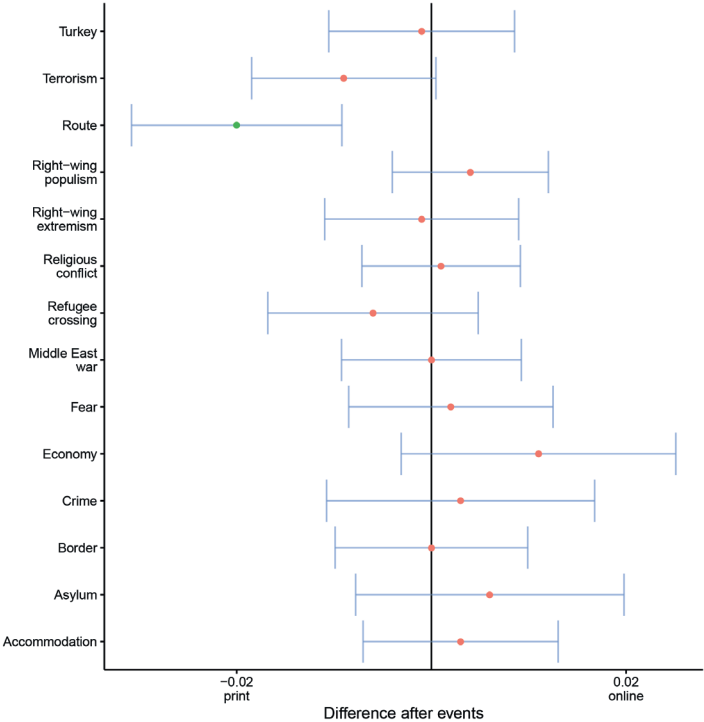


Figure 4: Differences in frame salience between online and print media during key events.
Note: Estimates based on models of Table B2 in Appendix B (plotted are interactions between online/print dummy and event dummy; the respective main effects are shown in Table B2).

captures whether the overall spread of frames in a week is more (values closer to 0) or less (values closer to 1) equal. A higher score therefore indicates a more diverse range of frames used within articles during a week.

Figure 5 shows that, while frame variability fluctuates over time, it is almost always larger in print than in online media. This means print media exhibit a more diverse pattern, whereas online media are slightly but consistently more dominated by particular frames. Averaged over all weeks, this difference is statistically significant ($p < 0.001$), which is in line with our second hypothesis, stating that print news shows more frame diversity.¹²

¹² This difference remains statistically significant even when duplicates are not removed from the data ($p < 0.001$).

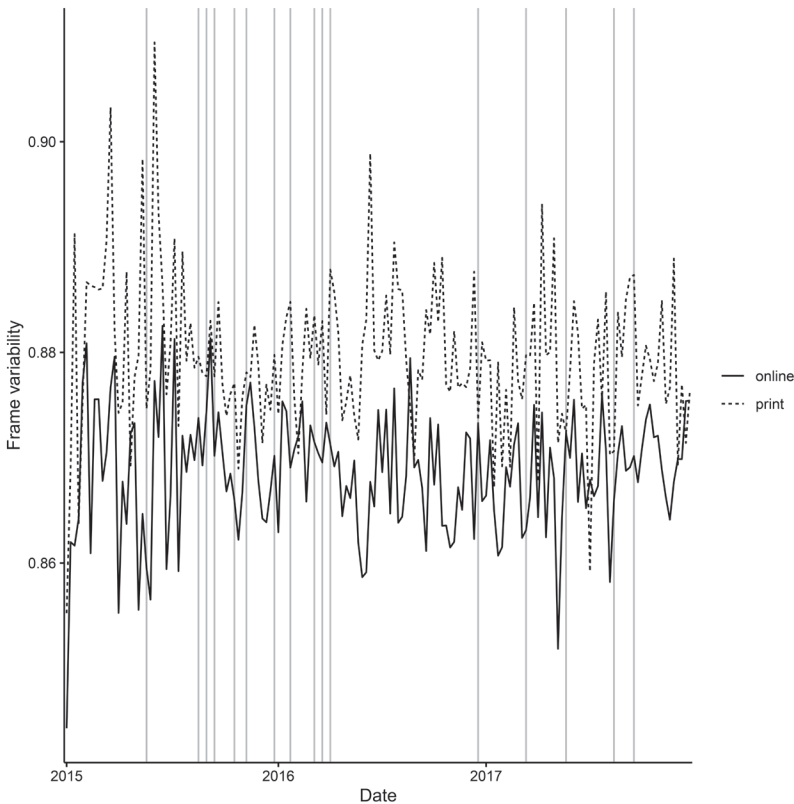


Figure 5: Variability of frame usage in online and print media over time.

Note: Vertical grey lines are key events (see Appendix A).

To test the impact of key events on the differences in the diversity of frame usage (H3a/b), we first compare media coverage during key events (up to one week after) to periods outside of key events. Reporting after important events does not significantly differ from other times in terms of frame usage ($p = 0.28$), refuting H3a. In a final step, we tested whether the difference in frame variability between online and print media is more pronounced during key events. Similar to the results discussed above, frame usage is significantly larger for print than for online news at times outside of key events ($p < 0.001$). However, this difference is not significantly stronger during key events ($p = 0.776$). In sum, this indicates that key events neither affect frame diversity in general, nor do such events trigger greater diversity in print (than online) media, as hypothesized in H3b.

4 Conclusion

News media play a key role in providing and interpreting the information related to phenomena that go beyond direct experiences, such as immigration. The impact of mass media on individual ethnic prejudice has been discussed for decades (see, e.g., Allport, 1979, pp. 200 ff.) and has more recently become a main subject in empirical-quantitative studies (Boomgaarden and Vliegenthart, 2007; Czymara and Dochow, 2018; van Klingeren et al., 2015; Meltzer et al., 2020). Since more people have started to read online media on a daily basis, examining differences between classical print versus online media is an important task to see what information people are actually exposed to. We addressed this question based on one of the most prominent topics of this decade: the so-called immigration crisis.

Returning to our first research question, which covered the appearance and developments of the frames used during the crisis, we have shown that 14 of the 20 frames underlying our model directly relate to the topic under consideration. These 14 partially overlapped with frames found in previous studies on the recent refugee situation in Europe, including the *economy*, *crime*, or *terrorism* frames (Greussing and Boomgaarden, 2017; Heidenreich et al., 2019). More generally, these frames relate to the more classic *victimization* and *problematization* frames (Bennet et al., 2013; Goodman and Speer, 2007; Horsti, 2007; Van Gorp, 2005). In addition to what previous research had found, we distinguished the frames *right-wing extremism*, *right-wing populism*, *Middle East war*, and *accommodation*, which were less visible in earlier studies.

Comparing print and online media pointed to some differences, with *fear*, *economy*, and *accommodation* being more visible in print, while *route*, *Turkey*, and *right-wing extremism/populism* were more visible in online news media. Our over time exploratory analysis showed that these differences were not necessarily present at all times but often related only to certain periods or, in some cases, developed at seemingly random times. This is an important finding, given the fact that this is often neglected in studies that apply print newspaper data as a proxy of news environments in general (Boomgaarden and Vliegenthart, 2007; Czymara and Dochow, 2018; van Klingeren et al., 2015). Furthermore, the perspectives of the growing number of people solely consuming news online might diverge from those primarily drawing upon print media. This indicates that people may not be stuck in filter bubbles in the traditional sense but that frame bubbles may well exist depending on the type of outlet people use.

Perspectives may also narrow, as we found a steady difference in the diversity of frame usage between both types of outlets, with online media emphasizing particular frames more than their print versions. Despite some of these system-

atic differences in frame visibility and variability, we should note that both types of news outlets followed the same general trends in frame usage across time. In other words, relative issue or frame saliences are likely to be rather similar. Relating these findings to the terminology used by Karlsson and Strömbäck (2010) (*convergence*, *immediacy*, and *interactivity*), we found that, despite online news being more interactive and relying more on ‘click-bait’ captions and writing more in terms of ‘what sells’, this did not mean that they applied more sensationalist frames than print media.

5 Discussion

We investigated the reporting about immigration and refugees in German quality media during the times of the so-called immigration crisis. Comparing the online and print versions of three major outlets with distinct online output, we found several frames that were constantly prominent and others that peaked at specific points in time. Differences between print outlets and their online equivalents give us knowledge on whether inferring from one to the other is eligible or not. However, since the period analyzed is in many respects exceptional, scholars may examine whether our findings hold for other issues, more niche outlets, other countries, or less turbulent times. Although there is no reason to assume that our findings are unique to the immigration issue, only future research will be able to tell whether this is indeed the case.

While we can offer new and important insights for both communication and social sciences, there are also limitations to our study. The first relates to the selection of what is usually considered quality media. The online outlets we observe reach many millions of visitors per month.¹³ However, this does not necessarily represent the news spectrum at large. Moreover, our most-similar-cases design leads to differences that should be seen as the lower boundaries of potential differences between online and print news. Examining more niche news websites or blogs, which can still have considerable reach, is likely to yield larger differences. In contrast to our design, however, such a comparison of ‘print apples and online oranges’ would make it harder to attribute potential differences merely on the characteristic ‘online’ or ‘print’.

Furthermore, we do not directly quantify the tone related to the different frames. Some frames are arguably inherently more positive and empathetic,

¹³ <https://de.statista.com/statistik/daten/studie/154154/umfrage/anzahl-der-visits-von-nachrichtenportalen/>

while others deal with undeniably negative issues, such as inter-ethnic conflict or terrorism. However, it is by no means certain that such frames are *applied* primarily positively or negatively. In fact, quality media are often difficult to classify in this respect (Lawlor, 2015). Developing more sophisticated sentiment analysis on these frames could be a promising endeavor for future research.

Despite our expectation, we did not observe that online articles were systematically shorter due to convergence. Yet, our analysis indicates that online coverage is more focused in terms of frame usage. Future research may further investigate the specific characteristics of online news content and especially the way it is received by its audience.

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