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Framing food in the news: Still keeping the politics out of the broccoli

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Abstract

Which and how food is produced and consumed matters for both our health and our societies' ecological food print. Yet, food practices seem to be a topic at the margins of news coverage and journalism studies. We narrow this research gap by exploring the framing of food in the news across different cultures. Combining automated and quantitative with manual and qualitative analysis techniques, we study 10,022 articles published in six elite newspapers from Germany, the United States (U.S.) and India (2016-2018). According to our analyses: Food-related terms are frequently mentioned, but rarely become the main topic of an article. We identified 23 *topics* that focus on food and found five broader *frames*. The frames *Pleasure and Art of Eating and Drinking* and *Body and Health* are most prominent, while other aspects as articulated in the frames *Sustainable Living*, and *Rituals and Traditions* as well as *Convenience and Price* are neglected. U.S. newspapers focus on recipes and restaurant reviews. Indian newspapers highlight health issues and weight loss. In Germany, there was less coverage focussing on food, but with a more even attention to different frames. Overall, food reporting remains to be apolitical, a diversity of food choices is covered - with subtle disregard for questions of sustainability.

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Introduction

Food choices understood as practices of producing, ordering, buying, eating, and wasting certain types of food are highly relevant to our individual and public health and for our ecological footprints. An increasingly plant-based diet helps to reduce a household's greenhouse gas emissions by about five percent (Lacroix 2018). The food system (including production and distribution) is considered a major driver for climate change and other ecological damage (Springmann et al. 2018). In order to feed a growing global population, researchers call for a "global transformation of the food system"

(Willett et al. 2019, p. 447). The Food and Agricultural Organization of the United Nations (FAO) and other experts see sustainable food choices as those that privilege plant-based (vegan and vegetarian), organic, regional and seasonal food, fairly traded food that is not wasted and not packaged in environmentally harmful ways (Burlingame 2012; Willett et al. 2019; Springmann et al. 2018). Yet, what scientists and experts consider sustainable food choices stand in stark contrast to actual food production and consumption patterns.

Thus, food practices could be expected to be high on the agenda of problems debated in news media given that journalism is normatively expected not only to entertain, but to contribute to identify issues of common concern for society and report issues that are not only new, but also relevant (Kovach and Rosenstiel 2014). Yet, as we will show, while news coverage mentions food-related terms frequently, food becomes the focus of news coverage much less frequently and is rarely framed as an ecological problem.

Journalistic coverage and framing of food matters for two reasons: Firstly, as sketched out above, food practices are, arguably, worth of intensive and critical public debate. Secondly, news frames still matter as contributions to the definition of public problems. Consumer food choices as well as political decisions about regulating the food system are embedded in public discourses, mostly in a mediated form through journalistic coverage and social media platforms. We argue that these debates influence what individuals consider a delicious, healthy, sustainable, normal or problematic diet as well as what society regards legitimate ways to produce, distribute and dispose of food. This is why we strive to explore how journalists frame food choices within their reporting.

While news coverage of certain specific food choices has been explored by some studies (e.g. focussing on cultured meat (Painter et al. 2020))), studies of general food coverage across different types of food choices are lacking in media and communication research. Moreover, there is a lack of comparative research going beyond single countries. How the national press frames food is likely to differ for newspapers published in different cultural and political contexts. Therefore, the current practice of studying exclusively one country, and mostly a country from the Anglo-Saxon world, does not necessarily generate findings that are applicable across countries. Therefore, comparative approaches are desirable including countries with different food traditions and journalism cultures. This is why we explore *how food is framed in newspaper coverage* across cultures with widely different food traditions (Germany, India and the U.S.).

Journalistic framing as a (changing) cultural practice

We will clarify our concept of journalistic framing in general before outlining the state of research specifically with regard to food.

Journalism's discursive power rests to a considerable degree on its contribution to the framing of social phenomena as relevant public problems. For example, food practices may or may not become an issue of journalistic coverage, depending on whether journalists frame them as part of a social problem and create a newsworthy story. When journalists do this, they do not make up frames but draw on the culturally repository of frames cognitively available to them (Brüggemann 2014). A frame provides the "central organizing idea[s]" of "interpretive packages" that help us make "sense of relevant events, suggesting what is at issue" (Gamson and Modigliani 1989, p. 3). Thus, frames are more than just 'topics' or 'themes', they are packages of interpretations and topics put into some kind of context. Different understandings co-exist as to what these 'contexts' are.

Influential in the field and also relevant to this study is the Entman (1993) formula that defines this contextualization as defining and evaluating problems, identifying causes and recommending solutions. Frames exist as typical combinations of these frame elements (Matthes 2009). In empirical research, framing analyses differ on whether they identify the frames on a clearly delimited case (e.g.

the framing of veganism in the British press debating the "Meat Free Mondays Campaign" (Morris 2017), studying a broader issue (e.g. the framing of food) or a generic definition of frames applicable to different types of issues (de Vreese 2005), e.g. the economic consequences frame (Semetko/Valkenburg 2000). Researchers have argued for combining these perspectives as frames in the news are in fact hybrid (Brüggemann and D'Angelo 2018): issue-specific definitions of social problems contain the broader generic frames. Frames can thus be studied on different levels of abstraction.

Choosing the appropriate level of abstraction for a frame analysis depends on the respective research interest. As we are interested broadly in how journalism frames food, we have engaged in a medium range framing analysis: identifying issue specific-frames, but focussing on a fairly broad issue. The resulting frames will be necessarily broad but should help to identify relevant patterns of interpreting food in the news. The comparison of different cultural and editorial backgrounds serves to identify their impact on the framing.

Following this understanding of framing, defining topics (what is at issue, in Gamson and Modgliani's words) is part of the framing process. This part, defining a phenomenon as a topic worth of reporting, is - obviously - a very important part of journalism. Some phenomena may just be overlooked as they do not fit professional routines such as perceived fit of occurrences with news factors (Östgaard 1965). The occurrence that is overlooked is the "non-event", as it was famously coined by Fishman (1997) who observed how court reporters ignored a protest in court and instead focussed only on noting down the regular proceedings.

Food practices may be such non-events routinely overlooked by news reporting, as we shall show in our analysis. Yet, this may be changing. Food related topics might emerge as part of newsworthy stories in the course of cultural change if food choices become problematic or in other ways culturally relevant – we will review the fairly scarce research on this topic below.

The second part of journalistic framing practices comprises the interpretive act of putting topics in context: interpreting occurrences as part of social problems, evaluating these problems, identifying causes for problems, attributing blame and responsibility to act as well as recommending solution paths (we have slightly adjusted the Entman (1993) formula here, and we think it is important to adapt it in the light of both the respective research questions and the kind of data under analysis).

In principle, journalism may not only normalize, but also problematize certain food choices. Given scientific reports on the damages done to ecosystems by our current food practices, it is plausible and, arguably, also normatively desirable, that journalists as critical watch-dogs might question e.g. established practices of heavy meat consumption or other aspects of food production, distribution and consumption. In (not) doing so, journalists frame food choices by (not) linking them to social or ecological problems.
Obviously, journalists are only one actor type in the process of public communication. Yet, even in a hybrid media system with a multitude of voices (Chadwick 2017), journalistic news outlets still serve as important sources contributing to the social construction of public problems. Particularly elite newspapers may establish a connection between expert interpretations (such as the World Food Organization's view on sustainable and healthy food choices) and popular ideas of 'superfood'.

To sum up our conceptual argument: journalistic framing practices include both (1) constructing newsworthy food-related topics and (2) contextualizing with analysis and evaluation, hinting at causes of problems and discussing possible solutions. Journalists are drawing on culture when framing food and while culture is relatively stable, it may also evolve. Thus, formerly unproblematic food choices or production routines may become problematic, desirable or otherwise relevant for journalistic coverage. In this process, journalists are both part of wider cultural changes and contribute to shape them by identifying and contextualizing topics worth of reporting.

Food as an issue neglected by journalism and journalism research

Now we will lay out what we know through empirical studies about the role of journalism in framing food. One may imagine that a basic issue of life and culture that raises both economic and political questions, will be heavily discussed in news media and intensely researched by journalism studies. Yet, this is not the case.

While there are only few analyses of food-related news content going beyond small case studies, a whole new discipline (*Food Studies*) has emerged around the academic exploration of food practices, featuring its own academic journals. Also, the fields of anthropology, sociology and cultural history have long discovered food as a topic for research, but studying food in the news has not been their main concern (Greene and Cramer 2011, p. X). There is, to our knowledge, no broad study of food coverage in leading news outlets comparing coverage across different countries. Thus, we find a substantial research gap given the issue's relevance for human culture and the preservation of species, land and water use and climate change. This is not to say, that there are no studies with relevant findings concerning food in news coverage.

First of all, past studies indicate that food, for a long time, has been a topic at the margins of journalistic coverage and it was rarely connected to public problems such as climate change in spite of evidence that food choices are very relevant for our individual ecological footprints (Friedlander et al. 2014a; Neff et al. 2009; Mayes 2015; Mittal 2013; Almiron and Zoppeddu 2015). A reason may be the "taken-for-granted-ness" of food practices (Greene and Cramer 2011) which does not generate the news factors that attract journalistic attention. People take decisions about food unconsciously overlooking more than 200 food-related decisions each day (Wansink and Sobal 2007). Journalists, likewise, are, apparently, equally overlooking food-related reporting opportunities.

Yet, during the last decades awareness of food as an important cultural practice going beyond sustenance has flourished leading to a cultural "food explosion" including intensified media attention, claim Greene and Cramer (2011, p. IX) in the introduction to an edited volume focused on food communication. However, their book does not include a study of news content related to food. There is, so far, no general, long-term study that might falsify or verify an increase in food-related reporting, but for Germany, a study has replicated an older study from the 1990s showing that at least the mere mentioning of food-related terms has been substantially increasing (Voigt and Höhn 2021).

Historically, food journalism emerged from the "women's pages" (Voss 2020), which were often featuring recipes (Nørgaard Kristensen & From 2012). Since then, food journalism has branched out heavily, from educating the middle class about taste and healthy nutrition in the 19th century, to "food … constructed as a site of pleasure" (2013, p. 100). Food coverage, mostly, is part of lifestyle journalism (Hanusch 2019). Lifestyle journalism, also sometimes called consumer or service journalism, is addressing consumer decisions, and thus topics that are close to everyday life (Fürsich 2012). Lifestyle journalists thus provide a service to readers, while also acting as "cultural intermediaries" and "taste makers" (Matthews and Maguire 2014, p. 1). In the case of food, it is especially interesting to witness how seemingly personal problems, such as desired weight loss, develop societal impact (Fürsich 2012, p. 15). Thus, these topics tie into larger issues, such as ecological considerations, and might culminate in "green lifestyle journalism", which is "making sense of emerging negotiations of sustainable living" (Craig 2016, p. 124). Lifestyle journalists may, thus, become "agents of change" with a tendency to not only praise certain products but also analysing broader trends shifting from providing direction in "'tastemaking' to 'sensemaking'" (Faramarzi 2019, p. 123). Lifestyle journalismhas also been heavily criticized for its lack of distance to commercial interests (Fürsich 2012, p. 15).

Yet, this change making needs to be seen in the context of self-conceptions of lifestyle journalists (in Germany), who want to "entertain, spread positivity, and inspire their readers" under constraints of a strong commercial dependency of life style journalism (Viererbl 2022; for similiar results drawing on data from Germany and Australia, see: Hanusch et al. 2017). In line with this are findings of a positive media coverage of food industry-driven technical innovations such as artificial meat (Painter et al. 2020).

Already one of the earliest newsroom studies emphasized that journalism tends to normalize upper middle-class lifestyles, at least in the United States (Gans 1979). Food journalism is said to also, traditionally, be "bound up with developing middle-class tastes, and their separation from 'popular' tastes" (Turner and Orange 2013, p. 97).

The prototypical food article is a recipe, a cookery column or a cooking show on TV or a restaurant review (English and Fleischman 2019). This legacy of traditional food coverage displays a tendency towards *a*political food coverage that does not problematize e.g. the ecological or social down-sides of food production and consumption.

A deeper analysis may, however, also identify the cultural politics behind certain ways of covering food, promoting certain values and even national identity constructions (as Duffy/Ashley show for the case of Singapore, 2012). Also, for limited debates (in this case: British supermarkets claiming to promote less sugar) food leaves the soft news sections of the newspapers and moves into the hard news ones (Topic 2018).

A number of studies focus on journalistic coverage of certain food choices such as meat consumption or veganism. Media coverage is said to normalize meat consumption by avoiding critical debates about this food choice (Chiles 2017). Journalism may have contributed to the normalization of e.g. heavy meat consumption first and foremost by *not* putting it onto the news agenda and not questioning it. The link between meat consumption and climate change constituted a "blind spot" in the coverage of Italian and Spanish newspapers, where the impact of meat eating was played down (Almiron and Zoppeddu 2015). Similar results are reported from U.S. media (Neff et al. 2009) and Australian media (Friedlander et al. 2014b). In the first decade of the 21st century in Norwegian newspapers, the environmental call to reduce meat consumption was competing with the claim that "local" meat would be sustainable (Austgulen 2014). North-American media still paint an "overly positive" image of meat production and consumption, find Bateman et al. (2019), who compared the meat-related topics and frames of U.S. and Canadian newspapers and blogs. Blogs framed food as a social problem more often than legacy media outlets. A critical view of traditional meat-based food practices seems to thrive also on social networks where being vegetarian or vegan and using social media correlate (Kley et al. 2022).

Sustainable (organic, plant-based) food choices were treated rarely, but positively in media coverage in Anglo-Saxon countries during the 1990s. A simplified scheme of the "natural" (organic) vs. "the chemical" (GMOs) was constructed (Lockie 2006). A study by Cole and Morgan (2011) drawing on data from 2007 press coverage in the United Kingdom finds "vegaphobia" in the press. This may be slowly changing: studying the British de-meatification debate around the "Meat-free-Mondays" campaign, Morris (2017) finds that the media provided positive articles about eating less meat, albeit less so in the conservative press. Yet, while eating less meat ("meat-free Mondays" initiative) is welcomed, vegetarianism is depicted as an overly extreme option.

The typical apolitical coverage normalizes meat eating: it is "*taking the politics out of the broccoli*", as the title of Morris' study claims (2017). In line with this, there are only rare explicit connections being drawn in news coverage between animal food and climate change (Neff et al. 2009).

The impacts of mediated food discourses have also been studied and show that there are (modest) effects of media content on attitudes towards food. In a unique study Belloti and Panzoni (2016) compared food-related supermarket expenses of thousands of readers of different British newspapers. Yet, only minimal effects of newspaper reading could be observed. Some effects were significant: more reading correlated with organic, whole grain and low salt products. Reading the conservative *Telegraph* related to higher expenses for meat. A more conventional media effects study (an experiment conducted with 145 students) showed that watching a documentary questioning organic food labels undermines trust in organic food, an effect that persists even after two weeks (Müller and Gaus 2015). Prior attitudes are a strong predictor (Hilverda et al. 2017) and mediator (Müller and Gaus 2015) of social and journalistic media effects on attitudes concerning certain food choices.

Summing up, past studies have shown that food practices occur at the margins of journalistic coverage, as positively-framed soft news that do not problematize but rather normalize food choices, particularly meat consumption. Comparison between conservative and liberal media reveals differences with regards to justifying meat consumption and criticizing veganism. Due to their narrow focus on studying limited debates, including only small numbers of articles, mostly from one country, mostly on only one food choice, the findings reported above provide only first hints about broader patterns in food reporting. As some of them indicate change in food coverage, it is also worth looking at a more recent time frame than most studies do. To the best of our knowledge, there is no integrative current study to analyse the coverage of different food choices in different countries. None of the studies mentioned above can say, how e.g. meat consumption is framed as compared to the diversity of other food choices such as organic, fair, vegan food and how the framing of food differs in different countries. Given this rather large research gap, we will pursue a deliberately general research question: *How is food framed in the news?*

Following the findings reported above that food is an issue at the margins of news coverage, we will quantify the salience of food-centered news as opposed to merely mentioning the words "food" or "eat". We will thus identify the share of articles with a focus on food practices as compared to articles just mentioning food.

RQ1: How salient are food-centered topics in the news as compared to news merely mentioning food?

Following our conceptualization of frames as patterns of interpretations that include both issue definitions (topics) and contextual interpretations and evaluations, we ask:

RQ2: How are food-related topics framed?

As mentioned, there is a lack of comparative research, we can nevertheless assume that food reporting differs in different socio-political contexts. As the main cleavage in discussing food (as analysed by past studies) runs between meat and plant-based food choices, we will explore three countries that differ with regards to this variable (see: Methods). Also, past research indicates that news outlet's food coverage differs depending on the general ideological stance. We will therefore explore several news outlets per country representing different political leanings and ask:

RQ3: What are the differences in how food is framed in different newspapers in Germany, the U.S., and India?

Methods

Our study combines techniques of automated and manual content analysis in order to cover a broad sample of news articles related to the context of food and provide the in-depth examination needed for frame analysis. Therefore, we adopted a multi-stage process: (1) We drew on an exploratory prior

qualitative content analysis of a small sub-sample of our data to identify salient frames on food. (2) Moving to our larger comprehensive sample of articles, we used topic modeling to statistically extract topics in our sample of articles that mention food. (3) We looked closer at the words and top articles representing the different topics and manually identified those that really focus on food. This resulted in a bundle of food-related topics, which constitute the sample for the deeper subsequent analysis. (4) The topics were coded manually as (potential) instances of frames.

Sampling

We examine how food is covered in news media using a total of six newspapers from India, the U.S. and Germany. The three countries represent different food cultures, as indicated e.g. by different levels of meat- and plant-based nutrition. OECD meat consumption data shows that North American annual per capita meat consumption is at almost 100 kilogram per capita, while Europe is situated above 60 kg and the broad Asia/Pacific region at above 25 kg (OECD/FAO 2021). India, historically, displays low levels of meat consumption for religious, cultural and economic reasons. The United States provides the counter- example of heavy per capita meat consumption, while Germany has a relatively high share of vegetarians among Western countries both due to long-standing traditions of vegetarianism and more recent trends (see for a transnational overview: Willett et al. 2019; Heinrich-Böll-Stiftung and Friends of the Earth 2014). Thus, the three country study allows to map how different food systems impact the framing of food in the news.

All of the selected media offerings have a high readership and circulation figures, but differ in orientation insofar as one newspaper tends to be more conservative, the other more left-leaning, studying *Die Welt* and *Süddeutsche Zeitung* from Germany, *The Hindu* and *The Times of India from India and* from the U.S., we consider *The New York Times* and *The Wall Street Journal*.

Search terms to identify food-related coverage were deliberately defined as broad as possible in order to gather the whole variety of food related coverage. In the pre-study, we have qualitatively explored different word combinations in order to find a good compromise of high recall and precision in sampling relevant articles. For the English language media content we used the following search string: (food OR diet OR nutrition) AND (eat OR drink). The German search string needed to be slightly more complex, as our tests with various word combinations suggested: (Essen OR Nahrung OR Nahrungsmittel OR Ernährung) AND (essen OR trinken) NOT (in Essen) NOT (Stadt Essen). The aim was to avoid too strong restrictions and research bias due to predefined narrow keywords such as "veganism" or "meat".

We searched the database *Factiva* covering a time span of two years (01.06.2016 - 31.05.2018). A total of 14,520 articles were saved, all of them mentioning food. The German search terms generated considerable more hits (see Table 1). We took a random sample, containing 3,500 German articles, divided equally between the two news sources. Thus, we were able to ensure a similar number of articles from all three countries appeared in the corpus and avoided a bias when applying topic modeling towards patterns of words in the German articles. German-language documents were automatically translated into English using the *Google Cloud Translation API* to ensure improved comparability (for a validation of this method, see: Vries et al. 2018). We assessed the quality of the translations by randomly selecting translated texts and checking them against the German-language originals. In total, our corpus finally comprised 10,022 articles.

INSERT TABLE 1 HERE

Combination of qualitative content analysis and topic modeling

The qualitative content analyses (following Mayring 2000; Schreier 2012) were conducted using the software *MAXQDA*. The reliability of the qualitative coding decisions was assured by coding with several coders and then discussing the codings, if the decisions of individual coders diverged.

The first preliminary set of frames for the analysis was identified in an exploratory qualitative content analysis in a pre-study of a small subsample of 60 articles resulting in four frames (published online as a working paper explaining the method and results in detail: Mittal/Brüggemann 2019). Revising this framework in the light of this analysis of the full sample in this study lead us to add a fifth frame.

We began our analysis by applying topic modeling to the entire corpus. Topic modeling is based on generative models in machine learning and natural language processing (Grün and Hornik 2011): Topic models are "latent variable models of documents that exploit the correlations among the words and latent semantic themes" (Blei and Lafferty 2007). We used the most extensively utilized *Latent Dirichlet Allocation* (*LDA*) statistical algorithm, an unsupervised technique to organize text. It creates topics in an automated way "representing probability distributions on sets of words" (Blei et al. 2003) and offers the advantage that no complex annotation is required in advance, no prior knowledge of the texts is necessary, and that explorative discovery of new topics is possible, perhaps not yet known in advance (Keller et al. 2019).

Using the *R* programming language we pre-processed our data: We replaced common non-ASCII characters, converted the whole text to lower case letters, removed URLs and intra-word dashes. Symbols were converted into word equivalents, contractions were transformed back to their base words. We deleted all the numbers and punctuation, the precise names of the media providers, common abbreviations and stop-words.

We considered only nouns and adjectives for the LDA model, making use of part-of-speech tagging. Through lemmatization, words were traced back to their morphological root form on the basis of a dictionary, resulting in linguistically correct word forms (Ponweiser 2012) and term unification. This avoids to include duplicates in the analysis, for example, terms in both their singular and plural form. We have chosen lemmatization instead of stemming "because a word's lemma is usually easier to interpret than its stem": e.g. the word *organized* gets reduced to its stem word, *organ*, while its lemma is still *organize* and thus is easier to interpret correctly (Maier et al. 2018, p. 110). Both normalization techniques, may also have negative influence on topic stability (Schofield and Mimno 2016; Walter and Ophir 2019) and by shortening the inflectional forms in lemmatization some information may be lost (Baden et al. 2020). Yet, including the exact grammatical form did not seem relevant to our research questions.

We only kept words that had at minimum two characters. Terms that appeared in less than two documents have been discarded, too. We also removed sparse terms, i.e. tokens that occur rarely and kept only terms that are used at least in one percent of the documents, resulting in a final document-term matrix (DTM) with 10,022 rows and 3,423 columns.

Using the *R topicmodels* package by Grün and Hornik (2011), we tested various options in which K (number of topics) ranged from 10 to 300, graduated in increments of 10. To determine K, we looked at the perplexity of models across different K and five-fold cross-validation as well as semantic coherence and exclusivity of the topics. After running varying numbers of topics, we decided to take a closer look at the range between 50 < K < 80. Proceeding in steps of five, we looked at the top-20 terms and discussed their interpretability in the research team (Maier et al. 2018). We agreed on K = 75, because the topics were interpretable, the output revealed a variety of different thematic facets and at the same time the topics did not seem too small-scale. We opted for this high number of topics following the recommendation that "it is better to use too many rather than too few topics, since irrelevant topics will be discarded in the next stages" (Ylä-Anttila et al. 2021).

We looked at the top 20 words and the top 10 articles with the highest probabilities for each topic in order to determine which topics were actually focused on food and to come up with meaningful labels for them. All articles mention food (the search terms), but not all articles in the sample really focus on food. Likewise, many automatically identified topics were not focussed on food. Two researchers decided independently whether the respective topic was focused on food and what a useful label could be. The results were discussed in the research team agreeing on the selection and labelling of topics in a procedure that took several rounds of refinement and discussion. The team consists both of members with and without domain (food debate in different countries) specific knowledge thus representing both expert and lay interpretations of the topics generated.

This method of interpretation in a group with diverse expertise is our approach to enhancing the intersubjectivity of our interpretations when labelling the topics and deciding that 23 topics out of 75 topics were actually food-related topics and not just topics in a sample of articles that mention food.

The next step was the qualitative content analysis of the top 10 articles for each of the 23 food-related topics. It meant closely reading in order to evaluate whether the topic can be interpreted as instance of one of our food frames generated in the prior qualitative study. The first exploratory phase resulted in the identification of a fifth frame not yet identified in the small-scale qualitative pre-study. Otherwise, the framework from the pre-study could be used to classify the topics of the topic modeling.

Our approach differs from the assumption of some scholars that topics from topic modeling always can be interpreted as frames: while topics are the results of an algorithm, frames are patterns of interpretation rooted in culture and understood by audiences. This is why the step of qualitative interpretation is an essential step in linking topics and frames. In our approach the relationship of topics and frames is thus subject to the empirical (qualitative) analysis: topics may but do not necessarily represent frames. If several researchers were able to agree upon classifying almost all top ten articles of a given topic as instances of a frame, then we decided to use the topic as indicator of a frame. We decided for accepting topics as instances of frames if at least 8 out of the top 10 articles per topic represented instances of a frame. A research assistant carefully coded all 230 articles (10 articles per topic) and the lead author also checked all of the coding decisions.

Thus, topic modeling may serve as a lever to identify the distribution of the frames in the whole sample without manually coding all articles in the sample. This logic has been applied by other studies (Bateman et al. 2019) and is closely related to what Baden et al. (2020) coin "hybrid content analysis".

Findings and discussion

Salience of food-related topics (RQ1)

We first address the salience of food related topics in the news. It is worth to reiterate that we were able to find 14,500 articles in two years mentioning food (see Table 1, above). Arguably, food terms are *mentioned* frequently in news coverage. Yet, the qualitative analysis of the top terms related to the 75 topics identified in the topic modeling reveals that only 23 topics actually are related to food (see next section).

In other words: 65 percent of the articles mentioning food-related terms do *not* actually feature food-related topics most prominently. The respective topics, excluded for mere mentioning of food at some point, dealt with, for example, family and friendship relations, lifestyle and social networks, holiday travels, arts and culture, house (re)construction, athletic competitions, scientific research,

patient care, digital developments in the tech sector, wildlife, environmental disasters such as hurricanes or floods and emergency supplies, armed conflicts and wars, refugee movements and camps, or about the former U.S. President Donald Trump as contexts where food is mentioned.

Apparently, food is included in the news as a taken-for granted part of live: the words eat, drink, food are mentioned frequently. Yet, food is much less frequently a matter of close journalistic scrutiny. Now, we will focus the analysis on the articles that do actually deal with food – in our study operationalized as those articles where one of the 23 food-related topics was most prominently represented as compared to other non-food topics.

Framing of food-related topics (RQ2)

Drawing on both our pre-study and an exploratory look at the topics identified in this study, we found five frames that shape news coverage of food that we label as: *Body and Health*, *Sustainable Living*, *Rituals and Traditions*, *Convenience and Price*, and *Pleasure and Art of Eating and Drinking*.

The *Pleasure and Art of Eating and Drinking* frame sees food as a matter of taste and something that should be consumed with pleasure. It worries about how to maximize taste both in preparing, selecting and consuming food. This is the most frequent frame in our sample. It contains topics like "Chefs and their restaurants", "Wine culture", and "Trends in alcoholic drinks". It is connected to all kinds of food choices, with a disregard for whether experts would label the respective food type as healthy or sustainable. The prominent "Food preparation and recipes" and "Restaurant recommendations" topics do not include key terms such as organic, vegetarian etc. but different types of meat and animal products as well as some vegetables (see Table 2). Other (less prominent) topics do focus on unhealthy food choices ("Wine culture", "Trends in alcoholic drinks", "Sweet food and drinks"), mostly disregarding their harmful health impacts, but rather focusing on their taste, for example when describing ice cream having „chocolaty, creamy and malty flavors, churned into a satiny ice cream that's veined with fudge sauce to create gooey, bittersweet ripples" (*The New York Times*).

The *Body and Health* frame is the second frame that clearly dominates food coverage. It identifies unhealthy food-related practices and ingredients as well as a lack of food safety as a problem and provides recommendations on how food may serve personal health and fitness. Topics include "Weight loss through healthy food", "Nutrition and healthy diets", and "Soft drinks and health considerations". While individual health considerations are at the center of most articles, we also find the fairly prominent topic of "Food safety and regulatory issues in India". This topic is special as it focusses on food safety and public rather than individual health issues and also includes a number of key terms (e.g. india, delhi, mumbai) that clearly indicate that the topic relates to India. Food safety, plausibly, is a far more urgent problem in India than in the U.S. and Germany, which explains why this topic is tied to one country.

The *Sustainable Living* frame identifies certain food-related practices and ingredients as harmful to the preservations of nature, animal-welfare or the global and enduring provision of humanity with food. It is predominant in only five percent of the articles. Related to this frame, the "Challenges for sustainable farming" topic deals with innovation in farming, discussing the use of GMOs and of new methods of regenerating soil. The topic "(Un)sustainable working and retail practices in fishing" criticizes unsustainable practices, arguing that even though many consumers don't want to pay higher prices, they "want to consume responsibly" (*Süddeutsche Zeitung*). In the "Sustainable meat and substitutes" topics, the latter is praised: "Proponents of the technology [growing meat from self-reproducing animal cells] say it could revolutionize a meat production system that uses much of the world's cropland to feed billions of cattle, hogs and chickens. The United Nations estimates that

animals raised for meat consume a third of the world's grain and use a quarter of all land for grazing" (*Wall Street Journal*). This shows that questions of sustainability are an established part of food coverage, but a comparatively small one.

The *Rituals and Traditions* frame cherishes traditional and established food practices (production as well as consumption) as part of a valuable cultural heritage that is worth of preserving. Tradition also entitles oneself to preserve established practices. It turns out to be very small covering only two percent of articles associated with one topic ("Celebrations: food tradition and customs").

The *Convenience and Price* frame sees food practices that are too expensive as a problem. It also problematized food choices that demanding too much time or effort to produce or prepare. Only one topic is related to this frame ("New ways of food retailing") covering only one percent of articles. The retailing topic is about shopping for groceries online via *Amazon*, for example (*The New York Times*).

INSERT FIGURE 1 HERE

INSERT TABLE 2 HERE

To sum up our findings about the news framing of food across countries: The *Pleasure and Art of Eating and Drinking* frame and the *Body and Health* frame clearly dominate coverage. We find that the top of the food-related news agenda, even in established national elite newspapers, is occupied by looking at food choices as a means of losing weight, providing recipes and recommending restaurants worrying about taste and to some degree about healthy diets but not so much about the environment or the price of food.

The exercise of coding topics as frames also showed the exploratory, inductive study was able to generate frames that work as a useful heuristic to analyse the news media debate on food. Only one topic (labelled as "Eating around the clock") did not fit into the framework (see Figure 1) and one other topic ("Balancing healthy and convenient food") featured articles that were evenly split between several frames including an article about conflicts about a mandate for vegan food in a school canteen among the top articles related to the topic. As could be expected, not all top articles of one topic were related to one of our frames, but the clear majority of the articles could be coded as instances of one and the same frame thus indicating a link between the topic and the frame.

The findings on the frequency of frames are not only relevant in what is covered, but even more so with respect to what is neglected: the lack of sustainability of our ways of producing and consuming food remains to be an issue at the margins of food coverage. Other studies which sample for "vegan" may find a lot of articles conscious of the ecological footprint of our food practices, but these articles are drowned in the sea of articles that mostly care about taste or a better diet. Here the roots of food coverage in lifestyle journalism rather than in the environmental, science or political beats clearly leaves its imprint on how food is framed.

The neglect of questions of affordable food or the practicalities of consuming food may be explained by the social group identification of many journalists employed by the big elite newspapers that we study. Being highly educated and situated in the bigger cities their focus is likely on what elites or the urban avant-garde is doing rather than the every-day problems of food consumption for people who lack the time, knowledge or opportunity to consume the latest trend food. Problems connected to daily consumption of highly processed fast food or not being able to afford sophisticated food may be less salient for the editor of e.g. *The New York Times* or *The Times of India* than for many food consumers in the U.S. or India. These constraints concerning food choice exist, also in Western societies, but do not regularly make it into the news.

Different contexts: Countries and newspapers (RQ3)

The food frames occur cross-nationally, in line with journalism being a profession that is practiced in broadly similar ways in democracies around the world (Deuze 2005). Yet, food practices are rooted in culture and therefore, it can only be expected that news media also reflect cultural differences in their reporting as different frames resonate in the respective context.

Figure 2 illustrates differences between the U.S., India and Germany with regards to the most prominent frames in the national elite newspapers under analysis. One of the particularly striking findings is the imbalance of the frames *Pleasure and Art of Eating and Drinking* and *Body and Health* across countries. While U.S. media are overwhelmingly reporting on topics relating to the *Pleasure and Art* frame (28%), with all other topics taking a backseat, newspapers in India focus mainly on topics concerning *Body and Health* (28%). Both of these findings can be explained through qualitative analysis of the related topics.

In the U.S., the frame *Pleasure and Art of Eating and Drinking* is made up of topics on the enjoyment of "Food preparation", the enjoyment of "Wine culture", as well as "Chefs and their restaurants" and "Restaurant recommendations". Thus, *The New York Times* praises the meat- and fish-based dishes in the article "Flavors Cross Borders at Little Tong Noodle Shop", and *The Wall Street Journal* reports that "Jean-Georges Vongerichten is going vegetarian at this 75-seat restaurant", thus covering differing diets in their praises. The only topic with criticism of certain food choices concerns "Health considerations around soft drinks", which is revolving around the introduction of taxes on soda drinks.

In India, *Body and Health* especially concerns two issues: food safety as a strong public health concern, in contrast to the newspaper debate in the U.S. and Germany. The second focus is on individual health defined mostly as weight loss, e.g. with the format of 'weight loss journeys' in *The Times of India*. The topics "Nutrition and healthy diets" and "Preventing disease through nutrition" point in the same direction. A variety of food choices are advertised here, e.g. super foods, vegan choices, and regional dishes in the separate topic "Asian food recommendations".

In Germany, the frames *Pleasure and Art of Eating and Drinking, Rituals and Traditions* and *Sustainable Living* are more evenly distributed. What can be highlighted is Germany's comparatively larger share of both the sustainability topics and the *Rituals and Traditions* frame associated with the topic "Celebrations: food traditions and customs". This topic concerns various Christmas traditions and beer festivals.

INSERT FIGURE 2 HERE

Nested within national or wider cultural patterns, there are also newspaper specific ways to cover food. Drawing on the tentative findings from past research, one might have expected to find differences between liberal and conservative papers with regards to normalizing or problematizing meat (respectively: plant-based) food choices. In terms of our frames, a stronger focus on sustainability could have been expected in the liberal newspapers and a stronger *Ritual and Traditions* frame in the conservative newspapers. Yet, this is not necessarily the case, as some of the newspapers in our sample show.

The liberal *Süddeutsche Zeitung* is most prominently featuring the frame *Rituals and Traditions* with the topic "Celebrations: food and traditions" (see Figure 3) and this is not due to being left-leaning, but due to its local roots in Bavaria (with its beer festivals and Christmas fairs). The *Süddeutsche Zeitung* is not only a national newspaper, but has strong regional readership in the south of Germany. It is likely, that regional media are likely to take the *Rituals and Traditions* perspective on food as they are more strongly rooted in local food cultures.

So, there are national patterns of food coverage reflected as similarities across different newsrooms: both, the conservative *Die Welt* (Berlin) and liberal *Süddeutsche Zeitung* (Munich) feature the topic "Chefs and their restaurants" prominently and also one sustainability topic is among the top three for both papers. Yet, a closer look reveals that within the topic "Sustainable meat substitutes", *Die Welt* reports how the "the search for high quality steak from local farms is still difficult" (*Die Welt*). Veggie sausages are described derisively as "replacement drug for vegans" ("Das Methadon der Veganer", *Die Welt*). So, a fine-grained analysis does find differences in line with past research, but the differences are not very pronounced in our corpus.

The U.S. newspapers in our sample have a strikingly similar strong focus on the *Pleasure and Art of Eating and Drinking* frame with the topics "Food preparation and recipes" and "Restaurant recommendations" at the top. Particularly, T*he New York Times* is well known not only for investigative reporting, but also for its extended food coverage. The recipes in our sample do not promote primarily plant-based food, but some are decidedly positive about the combination of vegetables and meat: "Pound for pound, there's nearly as much onion in the pot as there is meat, with the two flavours melding into each other. Bite into a strand of onion without any meat attached, and you'll emphatically taste the beef, while the meat absorbs all the oniony broth that surrounds it, becoming redolent as it falls apart on your fork." (*The New York Times*).

There is more variation among the Indian newspapers. While T*he Times of India* features exclusively *Body and Health* frame articles (including both the public health and the individual well-being and weight-loss perspective), *The Hindu* provides more diverse perspectives on food also including the topics related to *Body and Health* ("Asian Food Recommendations") and *Sustainable Living* ("Challenges for sustainable farming").

INSERT FIGURE 3 HERE

Conclusion and outlook

Our study complements past studies in providing a broader picture of the framing of food in the news across different types of food choices, topics, news outlets and countries. Focussing on single issues and often also single countries, past studies created an inconclusive picture, albeit with indications that meat consumption may be more likely to be normalized and plant-based food choices being depicted as a contentious issue.

We find that the press normalizes all sorts of food choices, namely by *not* covering food as an issue of critical, investigative scrutiny. Our first finding concerns the salience of food in the news: it is frequently mentioned, but rarely becomes the focus of news coverage. The second finding concerns the framing of food. It is not framed as a social problem – in stark contrast to how scientists and civil society actors exploring the ecological, equality, human rights or public health impacts of current food systems frame this topic. To come back to the title of one of the journal articles quoted earlier (Morris 2017): politics still is kept out of the broccoli.

There is no strong focus on questions of sustainability, in spite of the impact of food production and food choices for a number of ecological problems.

This absence of critical news stories related to food may still be the heritage of food as an issue of lifestyle journalism with a focus on soft news providing diversion and educating the readers about taste and new consumption trends.

Food coverage is, first of all, recommending where to get and how to consume tasty food and, secondly, advertising food choices that benefit personal health, often narrowly defined as weight loss. We do not find a bias towards advocating meat consumption and against vegetarian or vegan

diets. Neither our frames, nor the topics characterized by certain key terms, nor the deeper exploration of selected articles revealed a bias of journalism towards certain types of food choices, but rather a bias towards uncritical, positive coverage of all sorts of food choices.

Journalism is not fixed on certain diets but addicted to what is new, trendy and attractive to audiences. In sharp contrast to political news, negativity does not seem a strong news factor for food. This may, of course, have been different, if we had conducted our study at a time of food scares and scandals. Instead, we have covered a routine period without strong food-related events and a short time frame, dating back several years as well. Problems related to the unsustainability of our food system and consumption patterns suffer from the fact that they are not events, but slow long-term processes. Yet, one should also acknowledge that *Sustainable Living* exists as an established pattern of interpretation in all countries and newspapers.

Almost completely ignored were the frames *Convenience and Price* and, to a lesser degree, the frame of *Rituals and Traditions*. Both frames reflect the profane everyday cultures and structures of food production and consumption. The sociodemographic profile of elite newspaper journalists as people who may live in a more precarious situation than before - but not to an extent that they have to worry about the price of food might also explain the neglect of the frame related to food prices (for the profiles of journalists in the countries under study, see the respective country reports of the Worlds of Journalism study (for the profiles of journalists in the countries under study, see the respective country reports of the Worlds of Journalism study, Hanitzsch et al. 2019). Thus, our study has revealed some blind spots in food journalism and may encourage practitioners to also focus on the political dimension of the broccoli. Even restaurant reviews or the recipe section could, arguably, raise awareness with regards to the ecological dimensions of food choices. Political and economic journalism could engage in more investigations into the side-effects of our ways of producing and consuming food.

The comparative part of the study has been able to show how cultural contexts leave their imprint on food coverage: with the newspaper coverage in the U.S. being more concerned with the *Pleasure of Eating and Drinking*, Indian elite-newspapers worrying about *Body and Health*, and the German papers displaying overall less coverage but a somewhat more diverse interest in food.

While going beyond past studies, we still cover only three countries and six newspapers in two years. Additional countries and different types of media (particularly those catering less to national elites) should by all means also be studied more comprehensively. The general cross-national patterns of food coverage as identified in this study are likely to remain valid if other countries were studied, given that we have studied coverage in countries with fairly distinct food cultures. The clear country-specific patterns also show that we can expect different patterns in different cultural contexts not covered by this study. Yet, our five frames may be a useful framework also for future studies. Finally, future studies should establish a long-term perspective to clearly identify trends.

Our combination of qualitative and automated methods may open the way also for other studies to deal with large amounts of data. The coding of topics as frames as done in this study needs to be exercised with caution and given this interpretive part in our study, we took great care to not over interpret small differences in percentages but focus on the broader patterns instead. We see great potential for future research in this combination of digital automated methods and qualitative studies of journalistic content.

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Table 1: Newspaper sample

Country	Media outlet	Orientation[1]	Total number of articles per media outlet	Total number of articles per country	Sample
Germany	*Die Welt*	Conservative	1,997	7,998	3,500
	Süddeutsche Zeitung	Liberal	6,001		
India	*The Hindu*	Liberal	786	3,053	3,053
	The Times of India	Conservative	2,267		
USA	*The New York Times*	Liberal	2,559	3,469	3,469
	The Wall Street Journal	Conservative	910		

Figure 1: Food-related topics in the news
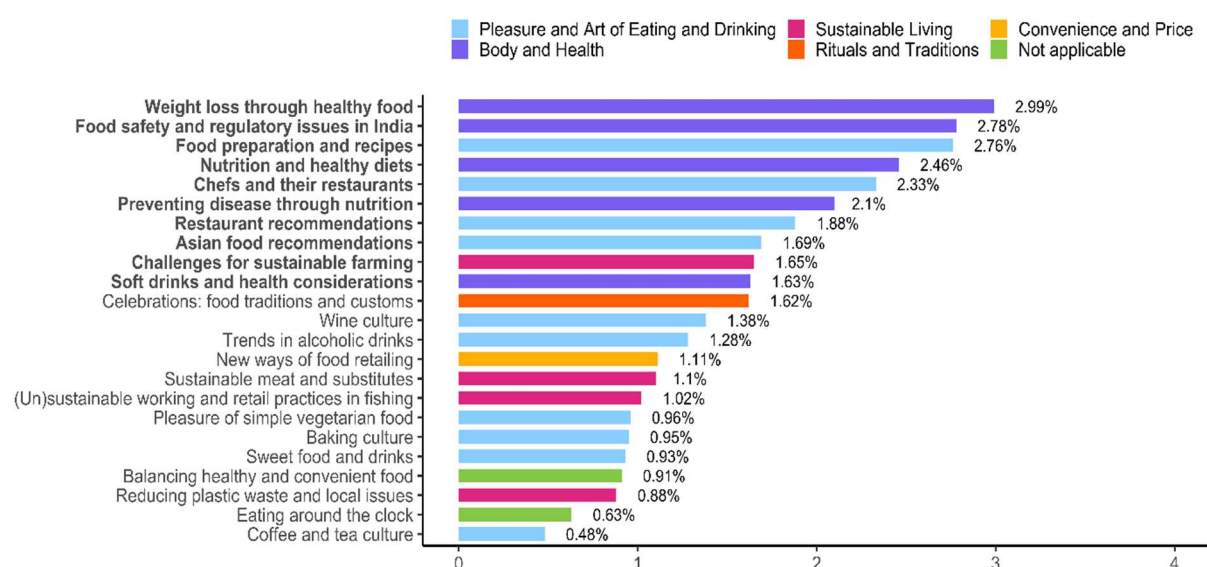
Percentage of food-related topics in the overall news corpus (n=10,022).

**Table 2: Frames and most salient topics associated with them**

Frame	Label (k): additional remarks	Topic proportions*	Primary topic count**	Top twenty terms
Pleasure and Art of Eating and Drinking Share of the sample: 15 %	**Food preparation and recipes** (36): recipes and preparation methods/tools	1.96	277	salt, oil, cup, tablespoon, pepper, heat, recipe, chicken, garlic, teaspoon, cook, sauce, pan, onion, olive, bowl, medium, lemon, pot, large
	Chefs and their restaurants (37): positive description of various types of food choices	1.55	234	restaurant, chef, kitchen, menu, cook, food, dish, cuisine, culinary, new, diner, owner, table, french, restaurateur, dine, ingredient, star, service, guest
	Restaurant recommendations (68): all sorts of food choices being advertised, mostly in the New York Times	1.42	188	menu, restaurant, table, sauce, room, fry, chicken, beef, duck, dinner, pork, dine, oyster, price, reservation, open, course, service, chef, bar

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[1] These categorizations are adopted from the preliminary study by Mittal and Brüggemann (2018: 25).

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	Asian food recommendations (29)	1.37	169	rice, food, dish, chicken, japanese, indian, noodle, asian, soup, curry, chinese, cuisine, fry, korean, spicy, spice, cook, taste, japan, vegetable
	Wine culture (21): advertising and normalizing wine consumption, top articles from NYT and WSJ	1.29	138	wine, bottle, grape, red, region, flavor, good, white, producer, vineyard, taste, spin-dry, fruit, vintage, champagne, great, selection, list, aroma, sparkle
	Trends in alcoholic drinks (56): consumption of alcohol being normalized and advertised	1.18	128	bar, drink, beer, cocktail, alcohol, liquor, glass, spirit, bottle, whiskey, gin, pub, craft, bartender, brewery, rum, vodka, brew, old, ounce
Body and Health Share of the sample: 12 %	**Weight loss through healthy food** (15): series "Personal weight loss journeys" in *Times of India*	1.74	300	weight, body, diet, loss, fitness, fat, healthy, calorie, workout, exercise, pound, gym, lifestyle, low, kilo, right, yoga, muscle, meal, change
	Food safety and regulatory issues in India (3): all top articles published in newspapers in India	1.90	279	india, indian, food, right, delhi, district, government, centre, official, village, department, state, mumbai, kumar, singh, lakh, due, officer, programme, kerala
	Nutrition and healthy diets (49): discussing proteins vs. carbs, milk, whole grain or vegan food	1.66	247	diet, fat, healthy, protein, nutrition, food, health, vitamin, acid, body, vegetable, fruit, nutrient, rich, grain, nutritionist, sugar, nutritional, calorie, high
	Preventing disease through nutrition (26): well-balanced food choices (of all sorts) advocated	1.61	210	blood, health, disease, risk, heart, diabetes, high, cancer, level, pressure, obesity, low, live, study, type, body, factor, alcohol, healthy, people
	Soft drinks and health considerations (47): sugar as ingredient being problematized	1.37	163	product, consumer, drink, sugar, food, brand, company, beverage, industry, health, label, sale, market, soda, tax, colon, ingredient, consumption, new, manufacturer
Sustainable Living Share of the sample: 5 %	**Challenges for sustainable farming** (35): organic, local, carbon-friendly farming practices, their economic challenges, discussions also about GMO crops	1.29	165	farm, farmer, plant, organic, crop, agriculture, climate, production, land, food, energy, agricultural, change, soil, carbon, seed, pesticide, field, vegetable, chemical
	Sustainable meat and substitutes (60): preaching less meat/flexitarianism, organic meat and lab meat substitutes	1.10	110	meat, animal, vegan, cow, vegetarian, beef, pig, milk, food, chicken, product, cattle, butcher, dairy, farm, sausage, pork, goat, grass, steak
	(Un)sustainable working and retail practices in fishing (23): sustainable fishing practices advertised and other practices	1.10	102	fish, island, sea, beach, boat, coast, water, ocean, bay, salmon, fisherman, ship, port,

	(overfishing, working conditions) criticized			oil, seafood, small, sand, deep, shore, fresh
Rituals and Traditions Share of the sample: 2 %	**Celebrations: food traditions and customs** (5): focus on food around Christmas/Diwali; minor overlap with Pleasure/Taste frame	1.28	162	guest, festival, event, party, christmas, holiday, host, special, table, celebration, fair, traditional, place, visitor, weekend, course, gift, hall, dinner, family
Convenience and Price Share of the sample: **1 %**	**New ways of food retailing** (62)	1.30	111	store, shop, customer, business, chain, food, market, service, delivery, grocery, owner, amazon, sale, supermarket, order, mall, retail, whole, item, retailer
*Topic proportions (third column): average probability that a topic occurs in the entire text collection ****Primary topic count (fourth column)**: rank-1 metric indicating how often a topic occurs as a primary topic in a document (cf. (Maier et al. 2018); only topics that are most salient in more than 100 articles are listed here				

Figure 2: Top-5 topics per country
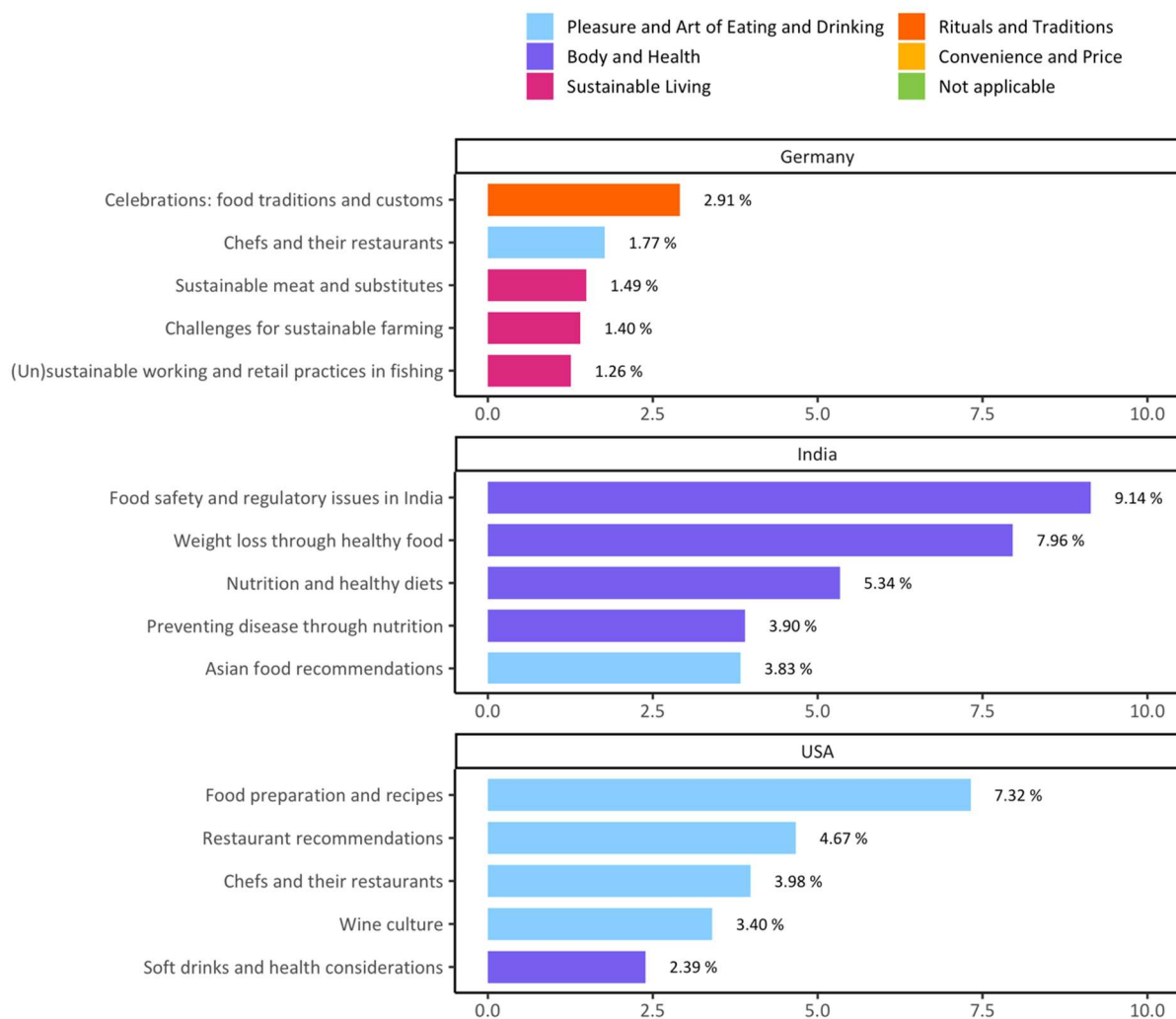
Percentage of top-5 food-related topics per country (Germany n=3,500; India n=3,053; USA n=3,469).

Figure 3: Top-3 topics by newspaper
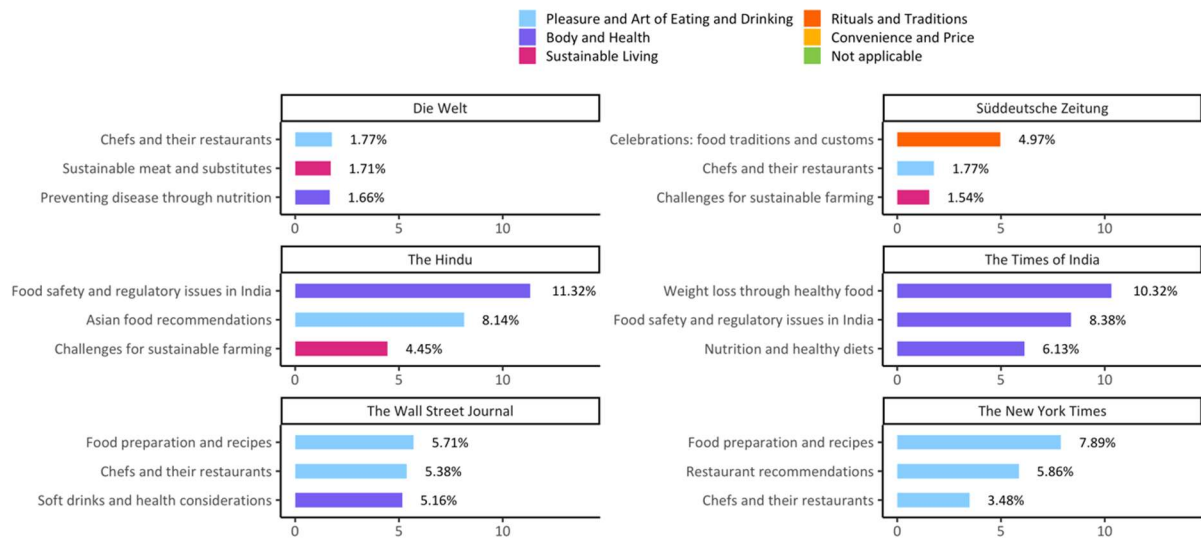
Percentage of top-3 food-related topics per news outlet (Die Welt n=1,750; Süddeutsche Zeitung n=1,750; The Hindu n=786; The Times of India n=2,267; The Wall Street Journal n=910; The New York Times n=2,559).