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Does online chatter matter for consumer behaviour? A priming experiment on organic food

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Abstract

Consumers are increasingly sharing their opinions on societal issues and products online. We studied the implications of such online word-of-mouth for consumer judgement and decision-making. The case used is organic food, which is the most successful among the currently emerging, sustainability-differentiated food product categories. We first analysed the online discussion on organic food by conducting a text-mining study of reader comments ($N = 63,379$) from the comments section of a major German online news outlet. Topics therein are discussed with differing frequency, thereby indicating the salience of the various issues to online readers and consumers. One organic food topic of high salience (animal welfare) and one of low salience (biodiversity) were selected to investigate the behavioural relevance of salient online topics in a subsequent priming experiment (online survey of German consumers; $N = 1,118$). In particular, we tested whether the relative online salience of the two topics used as primes influenced the likelihood of choosing organic instead of conventional eggs and milk in a choice experiment and the acceptance of policies supporting organic farming. Although ineffective for the choice of milk, the priming worked as hypothesized regarding the choice of eggs and policy acceptance. Priming the topic with high online salience is more effective at promoting pro-organic behaviour than priming the topic with low online salience. Priming effects also depended on prime strength, attitude strength and experience with buying organic food. We discuss how insights from text mining of online word-of-mouth can be employed to promote sustainable consumption behaviour.

KEYWORDS

associative network, consumer choices, organic food, priming, salience, text mining

1 | INTRODUCTION

People are increasingly sharing their opinions online. Today, 54% of the global populations have access to the Internet (ITU, 2019), and 51% use social media (e.g., blogs and discussion boards) and social networks (e.g., Facebook and Twitter) (DataReportal, 2020).

Worldwide, users spent a daily average of 2.5 hr online in 2018; this figure is expected to increase to over 3 hr by 2021 (Zenith, 2019). The rise of online participation platforms has provided new sources of insight into consumer perceptions, attitudes and behaviour (Balducci & Marinova, 2018). In particular, the text mining of online “chatter” that is online word-of-mouth or user-generated content (UGC; Tang

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et al., 2014; Zablocki et al., 2019) offers the possibility to “listen in” to discussions among consumers and find out what is on their minds. The widely available UGC online reveals the associations and product attributes that are salient to consumers (Gensler et al., 2015; Netzer et al., 2012). UGC is particularly valuable because it is created at the individual’s own initiative and without researcher influence as opposed to interview data, for example. The mere fact that users choose to express their concerns demonstrates the natural salience of these concerns and the users’ involvement with the respective topic (Ksiazek et al., 2016). Online comments are real expressions from real people aiming to express their views to other people on issues they are engaged in. This gives these expressions ecological validity. For the present purpose, we define “salient online topics” as associations mentioned in online discussions on a given issue. The volume of comments can be used as an alternative measure or indicator of the degree of user engagement (Ksiazek, 2018). The relative frequency with which a given topic is mentioned in online discussions can thus serve as an indicator of the relative salience of topics in the population online.

Researchers studying sustainable consumption have begun to analyse UGC in order to investigate consumer perception. They have taken stock of consumer beliefs and discussion topics as well as the relative salience of topics, including postings on sustainability-differentiated products such as organic food (Danner & Menapace, 2020; Meza & Park, 2016; Olson, 2017). Through (news) media consumption, peer-to-peer content and communication, online word-of-mouth and advertising, the online sphere can influence consumer perceptions of not only products and brands (Krishnamurthy & Kumar, 2018) but also sustainable consumption motives (Cooper et al., 2012; Frick et al., 2020; Thøgersen, 2014). Frick et al. (2020) found that simply “being” in online environments and the exposure to social media peer content and online advertisement influence sustainable consumption motives and behaviour. Hence, with the current level of digitalization and Internet use, where consumption patterns and their sustainability are increasingly discussed in and influenced by online environments (Chatzidakis & Mitussis, 2007; Reisch, 2001), research on sustainable consumption cannot ignore the online sphere.

However, to the best of our knowledge, there is only scant evidence on whether *what* is discussed online and how much it matters beyond the online sphere or, in particular, *how* the relative online salience of topics connects to everyday behavioural outcomes that are mostly offline (e.g., grocery shopping). This paper contributes to expanding knowledge in this unexplored area in several ways. First, it proposes a mechanism through which online salience might influence behaviour from the perspective of priming and spreading-activation theory. Second, it presents an empirical investigation of the relevance of the online salience of topics beyond the online sphere as reflected in how consumers respond to being primed with a topic that is highly salient (vs. not very salient) online. According to spreading-activation theory (Collins & Loftus, 1975; Fazio et al., 1986), priming increases the accessibility of associated knowledge, including evaluative knowledge, such as the attitude

towards the product, and attitude activation influences subsequent judgements and behaviours. With repeated exposure, the attitude becomes increasingly accessible and increasingly likely to influence behaviour (Berger & Mitchell, 1989). We assume that a prime based on a topic that is very salient online activates related attitudes more than a prime based on a topic of low online salience. However, to be sure, we empirically test whether online salience is related to the accessibility of associative networks (i.e., whether topics that are more salient online have higher activation power) and thus matter for how consumers respond to emerging product categories.

We specifically test the effect of priming topics that vary in online salience on different behavioural outcome variables related to organic food. The outcome variables investigated are the inclination to choose organic instead of conventional food in a choice experiment and the willingness to accept organic farming policy measures. The priming is done by exposing the participants of an online experiment to online news headlines. The topics included in the priming headlines were identified through a text-mining study in which topics discussed in the online comment section of a major German newspaper were identified as having high versus low online salience based on the number of user contributions mentioning the topic.

We use organic food as the case of study because organic food is the most successful representative of the emerging category of sustainability-differentiated products (Jackson et al., 2020; Willer et al., 2019) and has thus generated relatively many and engaged online expressions. Given that food consumption accounts for a large proportion of the environmental footprint of households (Poore & Nemecek, 2018; Tukker et al., 2010), understanding and promoting sustainable food consumption is of societal interest in its own right. Furthermore, despite increasing availability and familiarity and decreasing price premiums, the sales of more sustainable foods have remained relatively low, thereby suggesting a gap between the positive attitudes and the actual purchases of consumers (e.g., Aschemann-Witzel & Niebuhr Aagaard, 2014; Chekima et al., 2017; Janssen, 2018; Schäufole & Hamm, 2018). Not least when it comes to food, it is necessary to explore reasons for the attitude-behaviour gap and to find innovative approaches to promoting more sustainable purchases. Consumer values, attitude and drivers and barriers to organic food consumption are thus continuously explored in the light of different consumer behaviour theories (e.g., Chen, 2020; Rana & Paul, 2017; Ryan & Casidy, 2018). Previous studies revealed that consumers largely hold favourable attitudes towards organic food; this suggests a sales potential yet to be fully tapped (Rodríguez-Bermúdez et al., 2020). Considering the role of dispositional traits such as consumer optimism and pessimism, Sadiq et al. (2020) found that organic purchases can be spurred even among pessimistic consumers by inducing environmental concern. In food industry as in other areas, UGC might potentially provide novel insights into consumer rationales as well as into how to nudge consumers towards purchasing emerging sustainability-differentiated food products (Danner & Menapace, 2020). In particular, there is a substantial online discussion on organic food. The search term “organic food” thus provides a feasible search term to identify and

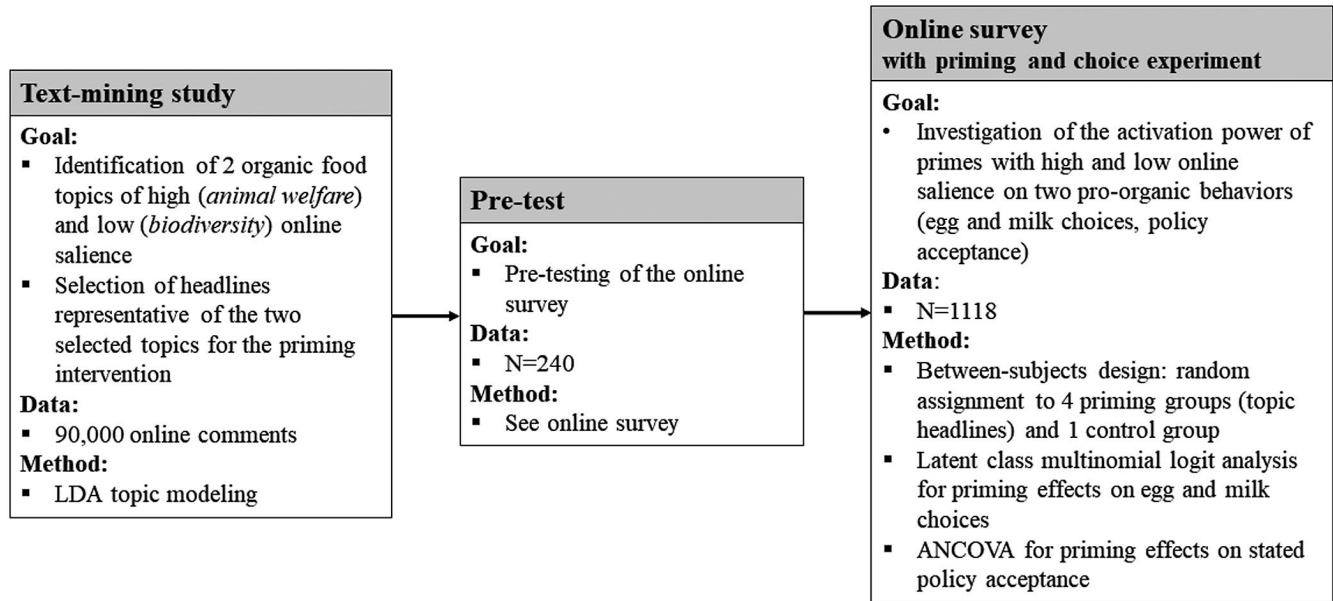


FIGURE 1 Research stages

gather the relevant discussion data to test—as we intend in the present research—whether salient topics can be used to prime pro-organic food behaviour.

This is followed by an overview of the theoretical basis of the study, including research objectives and hypotheses. We then present a text-mining study that we use to identify the priming topics followed by the priming experiment itself. The paper ends with a general discussion and conclusion. The research procedure is illustrated in Figure 1.

2 | THEORETICAL BACKGROUND

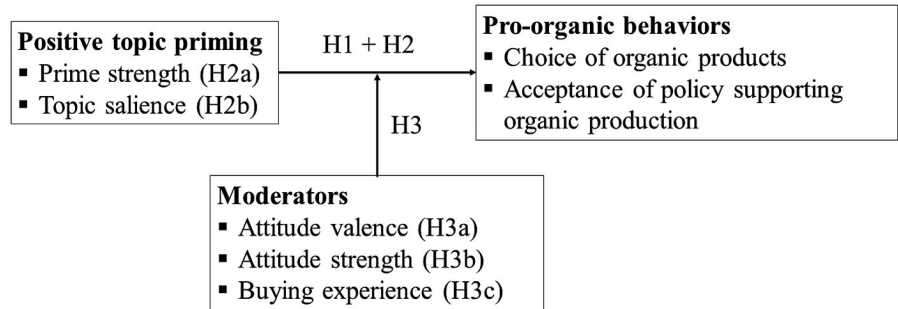
It is now common to conceptualize the storage of consumer knowledge in long-term memory as associative networks in which concepts are saved as nodes and among which information can spread (Bettman, 1979; Collins & Loftus, 1975). The spreading-activation model of associative memory (Collins & Loftus, 1975) suggests that external or internal cues that prime the knowledge stored in memory increase the accessibility of stored knowledge associated with the prime (cf., Janiszewski & Wyer, 2014; Minton et al., 2012). The stored knowledge also comprises attitudes, which are conceptualized as object-evaluation associations in memory Fazio (2007) as well as summary evaluations based on beliefs, affect and/or behavioural information from past behaviours and experiences (Fazio et al., 1982). Fazio's (1986) attitude-activation model suggests that attitudes guide behaviour because an activated attitude serves as the starting point for what is emphasized in the immediate situation, and thus the evaluation of the attitude object, decisions and behaviour. If the attitude is sufficiently accessible in memory, exposure to an attitude object will automatically activate the attitude. In addition, Fazio et al. (1986) showed that priming an attitude increases the likelihood that it is automatically activated as well as its

subsequent effect on product evaluations. Other studies found that the repeated exposure to cues priming the same attitude makes the attitude increasingly accessible from memory and increasingly likely to influence subsequent behaviour (Berger & Mitchell, 1989). In the MODE model, Fazio (1990) proposed that behaviour is guided by an automatically activated attitude whenever either motivation, ability or opportunity for further deliberation is lacking. However, when sufficient motivation, ability and opportunity are present, deliberate judgement and decision-making are likely as represented, for example, by the Theory of Planned Behavior (Ajzen, 1991; Ajzen & Fishbein, 2005). However, it is assumed that an automatic response is always activated first (cf., Kahneman, 2011). Mounting research has confirmed that automatic evaluations influence consumer judgement and decision-making (Petty et al., 2009). Such automatic evaluations are sometimes referred to as “implicit attitudes”, which are usually inferred from the speed of participants' reactions to the combination of primes and evaluations (Petty et al., 2009).

Various prime measures have been shown to be effective in automatically activating attitudes (for an overview, see Fazio & Olson, 2003). For example, Shavitt and Fazio (1991) demonstrated that the attitude towards a product (i.e., an attitude object) can be automatically activated not only by exposure to the product itself but also by exposure to an important product attribute. Priming specific attributes of an attitude object can affect subsequent behaviour (Posavac et al., 1997; Shavitt & Fazio, 1991).

In this study, we investigated priming effects on two important outcome variables: (1) the choice of organic food product alternatives (measured in a discrete choice experiment) and (2) the acceptance of policy supporting organic agriculture. The study thus covers both consumer and citizen perspectives with regard to organic food-related behaviour. Previous research has shown that participants are more likely to express their support for public goods such as food safety or animal welfare when acting as voting citizens rather than

FIGURE 2 Research framework and hypotheses



buying consumers (Alphonse et al., 2014; Tonsor et al., 2009). This suggests that some participants may support organic agriculture through their voting behaviour even if they do not (frequently) buy organic products (e.g., because of the high price).

Priming research suggests that priming a topic that is favourably associated with organic food will increase the likelihood of activating a favourable attitude towards organic food and therefore also the likelihood that the person will take favourable actions towards organic food (cf., Fazio et al., 1986). We specifically test the following baseline hypothesis regarding priming (Figure 2):

Hypothesis 1 *The priming of a topic that is favourably associated with organic food increases consumer choices of organic options and the acceptance of policy supporting organic food production.*

Information that is salient in one's environment can be "attention grabbing" and can therefore influence consumer judgements and decision-making (Tversky & Kahneman, 1974). By placing salient cues to relevant knowledge and attitudes in the environment, it is thus possible to "nudge" consumers towards a certain behaviour (Reisch & Zhao, 2017; Thaler & Sunstein, 2009). In particular, personally relevant and vivid examples, explanations or cues are effective "attention grabbers" (Blumenthal-Barby & Burroughs, 2012). The effectiveness of cues in the environment also depends on how easy or difficult they are to process and how strongly associated they are to relevant knowledge and attitudes in receivers' memory (Keller, 1991); this is linked to the frequency of prior exposure (i.e., familiarity) and direct experience (Berger & Mitchell, 1989).

In this paper, we use text mining to identify topics that are more or less salient in the consumers' online environment, which is assumed to influence the frequency of prior exposure to a topic and thus its effectiveness as a prime to activate relevant consumer attitudes, choices and behaviour. Previous research has shown that the analysis of UGC contributes suggestive empirical evidence for which associated product attributes or topics related to the product are more and less salient to consumers. For the case of organic food, Danner and Menapace (2020) and Olson (2017) have analysed the beliefs and topics discussed by users online and shown that some topics are more salient in the online discussion than others.

This paper investigates whether these different levels of salience of topics in an online environment are relevant to consumer behaviour offline. Based on spreading-activation theory (Collins

& Loftus, 1975) and Fazio's (2007) model of attitudes as object-evaluation associations of varying strength, we assume that topics that are very salient online have higher activation and spreading potential than topics of low salience primarily because the associative networks that the former topics are part of, including relevant attitudes, have been more frequently activated in the past (e.g., by reading online news on organic food and participating in the online discussion). Associations from large and interconnected associative networks have been shown to have high spreading potential (Nelson et al., 1993). The stronger the associations to a topic in memory, the more accessible associated attitudes are and thus the more likely their automatic activation (Fazio, 2007).

Against this background, we investigated whether the online salience of topics associated with organic food influences attitude accessibility, increases the activation of a favourable attitude and thus increases the likelihood of subsequent favourable behaviour. In an online experiment, we randomly allocated participants to be primed with either a topic favourably associated with organic food that was very salient online or an equally favourably associated topic that was not very salient online. Based on research on priming and on the importance of cue salience, we hypothesize:

Hypothesis 2 *The effectiveness of a priming intervention increases with (a) the perennial salience of the topic that is primed in the person's environment, including the online environment (i.e., online salience) as well as (b) the situational salience of the priming cue (i.e., the primed topic) in the person's immediate environment (i.e., prime strength).*

According to Fazio's attitude theory, the effect of priming depends on attitude strength (i.e., strong attitudes are more easily retrieved from memory; Fazio, 1995; Nayakankuppam et al., 2018). Attitude strength determines attitude accessibility (i.e., the ease with which an attitude is activated; Fazio et al., 1986). Attitudes based on direct experience are stronger and more accessible than attitudes based on information alone. Repeated exposure to information over time also leads to a richer cognitive network and therefore a more accessible attitude (Berger & Mitchell, 1989; Fazio & Zanna, 1981). We therefore hypothesize:

Hypothesis 3 *The effect of priming a topic that consumers associate favourably with organic food on the choice of organic options and*

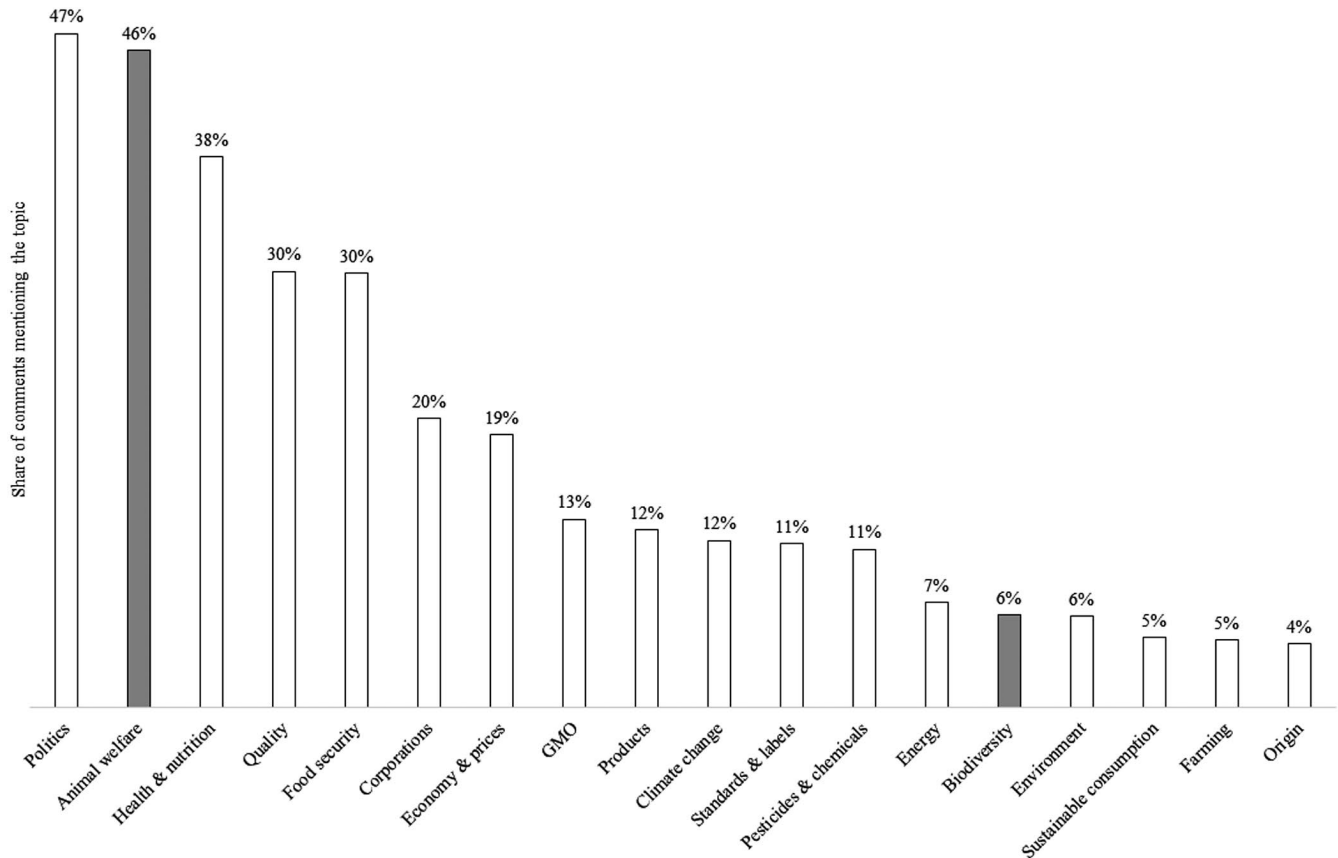


FIGURE 3 Overall proportion of comments on organic food mentioning each topic (2007–2017) on *spiegel.de*. The selected topics *animal welfare* and *biodiversity* are highlighted in grey

on the acceptance of a policy supporting organic food production increases with (a) attitude strength and (b) experience with buying organic food.

3 | TEXT-MINING STUDY ON THE ONLINE SALIENCE OF ORGANIC FOOD TOPICS

A text-mining study is used to identify an organic food topic of high online salience and one of low online salience for the priming experiment (Figure 1).

3.1 | Method

We analysed 63,379 reader comments about organic food published online on *spiegel.de*, which is among the most visited news outlets in Germany (IVW, 2020). We used data from January 2007 to December 2017¹ in order to ensure that our measure of the relative salience level of the topics was not overly influenced by single events

¹Unfortunately, comments on *spiegel.de* in 2018 and 2019 were not available because of website restructuring.

at any given point in time. We used the well-established Latent Dirichlet Allocation (LDA) algorithm (Blei, 2012) to model the topics. Topic modelling is a form of unsupervised machine-learning, which discovers latent semantic structures (i.e., topics) and models the probability of words in documents (i.e., comments). Topics are clusters of semantically similar and co-occurring words. The topic model yields a weighted combination of the different topics that represent a document. We used the relative proportion of comments that made mention of a topic as our indicator of the relative salience of topics.

3.2 | Results

Our text mining identified 18 different topics relating to organic food in the reader comments on *spiegel.de*. The relative salience of topics differed substantially, and *politics* and *animal welfare* were the most salient topics (Figure 3). An analysis over time showed that the relative salience of topics varied. However, despite certain peaks, it was quite stable over the decade covered by the text analysis. The average salience and salience stability indicate that some topics related to organic food are perennially more salient in this online environment than others.

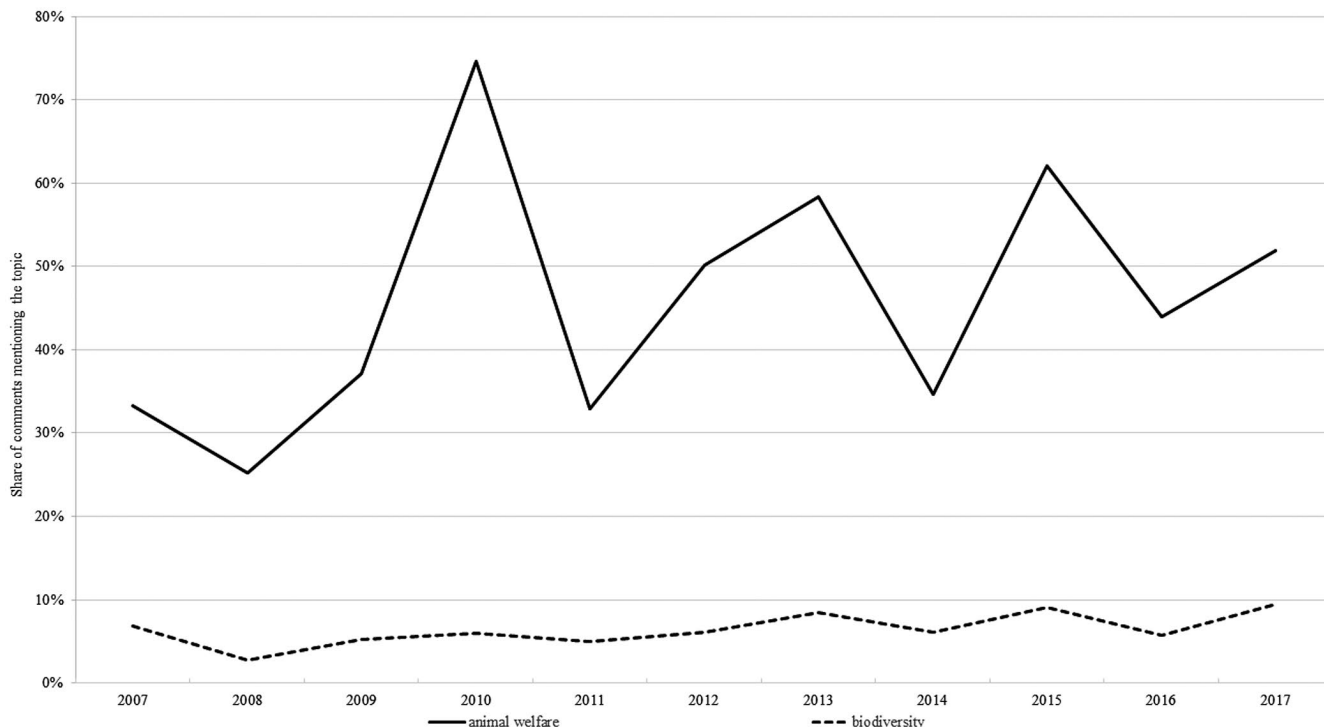


FIGURE 4 Proportion of comments on organic food mentioning the topics *animal welfare* and *biodiversity* over time (2007–2017) on *spiegel.de*

3.3 | Selection of organic food topics for the priming experiment

Based on the text-mining study, we chose *animal welfare* as a topic of relatively high salience and *biodiversity* as a topic of relatively low salience in relation to organic food. The two topics showed consistently different salience levels over time; animal welfare was consistently far more salient than biodiversity (Figure 4). Overall, animal welfare was represented in 46% of all comments and biodiversity in only 6% of comments (Figure 3). This is in line with previous qualitative UGC analyses finding that animal welfare is more than twice as salient in online user comments on organic food than biodiversity (Danner & Menapace, 2020). The animal welfare and biodiversity topics were therefore used as primes in the priming experiment (Section 4).

The comparability of the two topics was assured and their suitability for the priming experiment further supported because: (1) Animal welfare and biodiversity are both included in national and EU organic regulations (e.g., on animal husbandry, pesticide use, extensive land use and crop rotation). (2) The benefits of organic over conventional farming have been documented with regard to both topics (Spooler, 2007; Tuck et al., 2014) as opposed to topics such as healthiness for which the evidence on actual benefits is ambiguous (Smith-Spangler et al., 2012), despite being a main reason for buying organic food according to many studies (e.g., Rana & Paul, 2020; Rodríguez-Bermúdez et al., 2020). (3) Both of these topics generally have a positive connotation in consumer perception of organic food. (4) They both refer to public rather than private benefits. (5) Both

topics are also highly important product attributes of organic food in the eyes of German consumers (animal welfare was rated important by 95% and biodiversity by 85% of participants) according to a recent consumer survey (Federal Office for Agriculture and Food, 2020).

4 | PRIMING EXPERIMENT

The effects of priming the two organic food-related topics (*animal welfare* and *biodiversity*) were investigated by means of an online survey (Figure 1). We specifically investigated how the priming of each of the two topics influenced the willingness to choose organic food versus conventional options as well as the acceptance of a policy to promote organic food.

4.1 | Method

The data were collected in Germany in October 2019 by means of an online survey. The questionnaire was programmed in Qualtrics and administered by a market research company. A quota-sample was drawn so as to be representative of the German adult population in terms of gender, age, schooling, professional education and income. We screened participants to make sure they were at least partly responsible for grocery shopping in their households and that they bought the two products used in the priming experiment at least occasionally. The screening was meant to ensure that the behaviour

investigated was relevant to participants and thus increase the quality of the responses. After excluding 55 participants who compromised data quality because of not being able to meet realistic time requirements for completing the questionnaire, the final sample size (N) was 1,118. See Appendix A for the socio-demographic profile of the sample.

We randomly assigned participants to priming and control groups (4.1.1) and to two choice experiments (eggs and milk, 4.1.3). A comparison of the means confirmed that there were no relevant differences between the priming and control groups or between the eggs and milk group² with respect to registered sample characteristics (socio-demographics, attitude valence and strength, buying experience with organic food, importance of the priming topics, media use and trust; see Appendix B for an overview of all variables). Prior to the survey, the questionnaire and priming mechanism were pre-tested with participants recruited from the crowd-working platform Prolific (N = 240).

4.1.1 | Priming

Participants were randomly assigned to either one of four different priming groups or a control group (a between-subjects design). Participants in the priming groups were exposed to one of the selected topics (*animal welfare* or *biodiversity*). Participants exposed to each topic were further randomly divided into two groups (a strong and a weak priming group) in order to investigate the importance of the situational salience of the priming (or prime strength). This resulted in five groups in total: four priming groups and a control group.

The priming was done by exposing participants to seven headlines. In the control group, the neutral headlines were about topics unrelated to farming, food, animal welfare or biodiversity. In the experimental groups, weak/strong priming conditions, one/three of the seven neutral headlines were replaced by headlines related to either *animal welfare* (the topic of high online salience) or *biodiversity* (the topic of low online salience). See Appendix C for the priming scenario and items. The priming in the experimental groups was expected to activate the person's associative network regarding organic food and therefore increase the accessibility of, attention to, and preference for organic food (e.g., when choosing between organic and non-organic alternatives) to differing degrees, whereas the control group was intended to reveal the baseline predispositions of the participants.

4.1.2 | Procedure

After being welcomed and screened, the participants answered socio-demographic questions. This was followed by the priming. We

²At a Bonferroni-corrected level, only 3 out of 14 sample characteristic variables were significantly different in the eggs and milk group, and the effect sizes were small. For reasons of space, analyses were not reported but can be acquired from the authors.

then asked whether they would vote for a policy that would redistribute agricultural subsidies according to criteria favourable to the environment, the climate, and animal welfare and thus supportive of organic agriculture (Alphonse et al., 2014; Tonsor et al., 2009). See Appendix B for the wording of the policy acceptance items as well as all other items and scales used. Participants were then asked to make 12 choices between products, either eggs or milk. As filler questions, we asked the participants about the frequency of nine different media consumption behaviours and trust in media outlets (Gaziano & McGrath, 1986). We also measured attitude valence (the overall liking of organic food) with a single item and attitude strength with seven items: importance, centrality, identity, representativeness, certainty, subjective knowledge and likelihood of change (Pomerantz et al., 1995). We then measured experience with buying organic food (i.e., how long they have been buying it). Finally, the participants were asked about the importance of *animal welfare* and *biodiversity* in the context of organic food.

4.1.3 | Choice experiment design

For the discrete choice experiments, participants were randomly assigned to choose among either egg or milk products (to learn whether found effects are product-specific). Each participant made 12 repeated choices between two options for 10 eggs or 1 liter of milk. Participants were also free to choose "none of these" if none of the options were appealing. We introduced the choice situation as follows: "Imagine you are grocery shopping. You have the choice between different alternatives of milk/eggs. They differ regarding their packaging, their price, their origin and whether they were organically or conventionally produced." The product alternatives varied in terms of (1) *organic* versus non-organic, (2) *price* (eggs: €1.49, €2.39, €3.29 and €4.19; milk: €0.69, €0.99, €1.29 and €1.59 anchored by market prices at German retailers), (3) *origin* (local, Germany, EU) and (4) *packaging* (milk: normal Tetra Pak, Tetra Pak made from recycled materials; eggs: tray, loose). We used Ngene to create a defficient choice design (Street et al., 2005) resulting in 24 choice sets that were blocked into two equally large blocks of 12 choice sets each (see Figure 5 for examples) to which participants were randomly assigned in order to limit cognitive effort and prevent fatigue (Swait & Adamowicz, 2001).

4.2 | Results

The influence of the priming on choices is reported first followed by the influence on policy acceptance. For each outcome variable, direct effects are reported as well as the moderating impact of attitude strength and buying experience. Moderation by attitude valence was also tested but is not reported for reasons of space.³

³These results can be acquired from the first author.

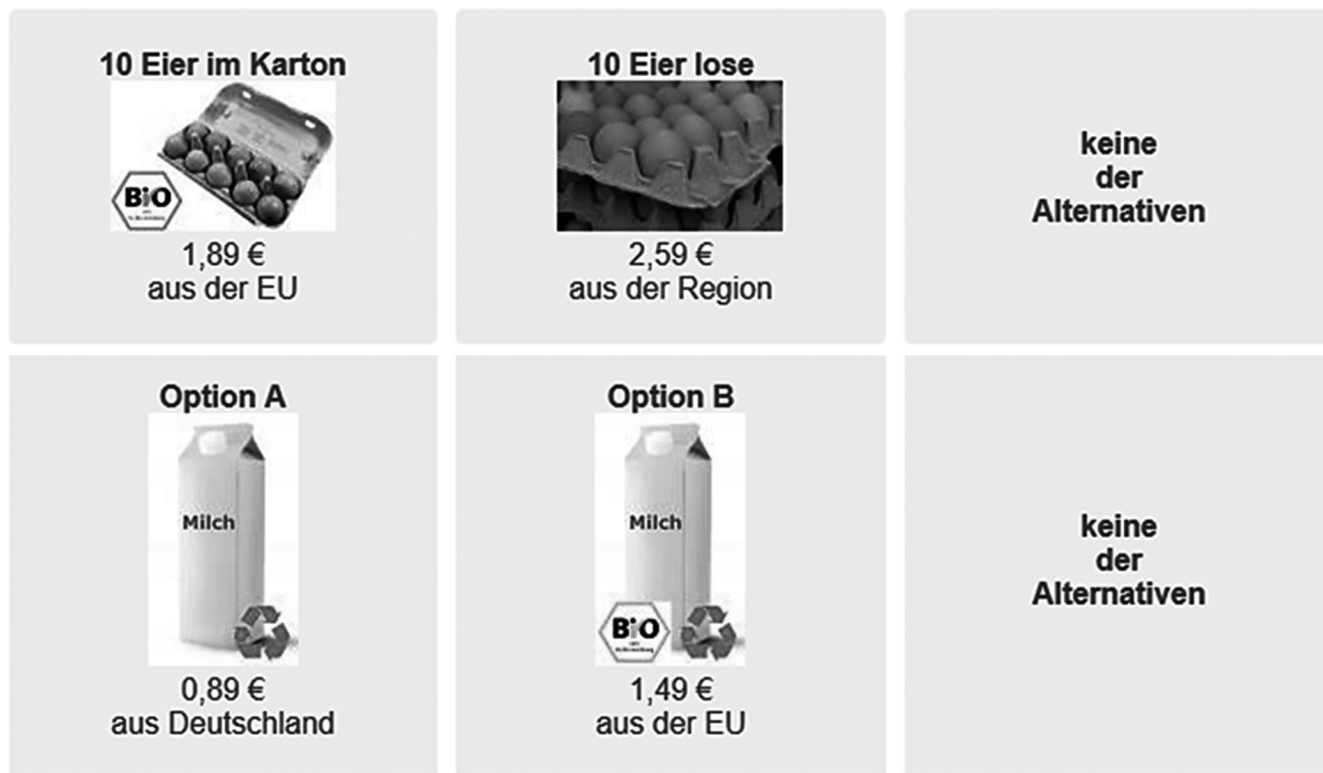


FIGURE 5 Examples of the eggs and milk choice sets

The effects pointed in the same direction as attitude strength and buying experience.

4.2.1 | Choice experiment

We estimated an extended multinomial logit model using Latent Gold 5.1 (Vermunt & Magidson, 2016), including the attributes of the alternatives as independent variables (McFadden, 1974). This was done separately for eggs and milk. In choice experiments, some participants make random choices without actually considering the alternatives; this can lead to biased parameter estimates (Grunert et al., 2015; Thøgersen & Alfinito, 2020; Thøgersen et al., 2019). In Latent Gold, it is possible to identify such random choosers by defining a latent class for which all levels of all attributes have equal utility (i.e., none of the attributes appear to matter for the choices made). Across the estimated models, approximately one fifth of the participants turned out to be random choosers; this is a considerable but not an exceptional proportion (Grunert et al., 2015).

When testing the effects of priming conditions, the four priming groups and the control group are defined as known classes. We tested (1) whether the importance of attributes and attribute levels differs between priming groups and the control group, and (2) whether estimated relationships are moderated by attitude strength and buying experience. *Price* is defined as a continuous variable and all other attributes as nominal. The reference levels are EU for *origin*, non-organic for *organic* and non-recycled Tetra pack/tray for *packaging*.

Four models are presented in Table 1: two for eggs and two for milk; one of each includes attitude strength and the other the duration of participants' experience with buying organic food as moderator. For all of the models presented, the Wald statistics show that choices were significantly influenced by *organic*, *packaging*, *origin* and *price*. As expected, lower prices were preferred over higher, organic over non-organic, more sustainable packaging over less and local origin over national, which in turn was preferred over EU origin. Because the priming intervention was specifically meant to influence the importance given to *organic*, we tested the equality of part worth utilities (i.e., regression parameter estimates) for this attribute across control and experiment groups. The Wald (=) statistic shows that part worth utilities differ significantly for *organic* across the five conditions. A paired Wald test is used to identify which specific conditions produced significantly different utilities.

For the choice of eggs (Models 1–2), we find that the online salience of topics used as primes matters for the effectiveness the priming. As hypothesized (H1), in both Models 1 and 2, receiving a strong *animal welfare* priming (the topic with high online salience) significantly increased the likelihood of choosing *organic*. The strong *animal welfare* priming was the only condition in which the preference for *organic* was significantly different from and higher than in the control group. Furthermore, in this condition, the preference for *organic* was also significantly higher than in the two *biodiversity* priming conditions. It thus appears that both a high online salience of the topic used for the priming (i.e., *animal welfare*, H2a) and a high situational salience (i.e., strong priming, H2b) are necessary for significantly increasing the choice of organic eggs, which only

TABLE 1 Latent class multinomial logit analyses for the choices of eggs and milk for the four priming conditions (weak/strong animal welfare [AW]), weak/strong biodiversity [BD]) and the control group moderated by attitude strength and experience with buying organic food

Prime topic	Animal welfare		Biodiversity		Control group	Wald (0)	Wald (=)	Wald (paired)
	Weak	Strong	Weak	Strong				
Model 1: Egg choices moderated by attitude strength (N = 633; 22% of random choosers excluded; R ² = 0.321)								
Class size	95	97	107	95	101			
Intercept	-0.083	-0.058	0.010	-0.083	-0.013	5.580 ^{ns}		
Organic	0.488	0.535	0.394	0.328	0.386	429.720***	12.741*	Weak AW > strong BD* Strong AW > weak BD* Strong AW > strong BD** Strong AW > CG*
Model 2: Egg choices moderated by buying experience (N = 633; 24% of random choosers excluded; R ² = 0.300)								
Class size	90	91	109	96	94			
Intercept	-0.136	-0.137	0.061	-0.092	-0.086	20.770***		Weak AW < Strong AW* Weak AW < weak BD* Strong AW > strong BD* Weak BD > strong BD*
Packaging	0.052	0.149	0.089	0.078	0.182	39.880***	6.027 ^{ns}	
Germany	0.212	0.117	0.111	0.345	0.124	1,150.536***	16.407*	
Local	0.789	0.986	0.911	0.706	0.984			
Price	-0.874	-0.642	-0.757	-1.139	-0.629	737.873***	36.106***	
None	-2.410	-2.707	-3.501	-3.347	-2.534	884.534***	594.856***	
Organic × attitude strength	0.279	0.443	0.430	0.269	0.308	243.770***	10.305*	

TABLE 1 (Continued)

Prime topic	Animal welfare		Biodiversity		Strong	Control group	Wald (0)	Wald (=)	Wald (paired)
	Weak	Strong	Weak	Strong					
Organic	0.389	0.640	0.436	0.377	0.402	407.625***	12.892*	Weak AW < strong AW** Strong AW > weak BD** Strong AW > strong BD** Strong AW > CG**	
Packaging	0.090	0.168	0.053	0.030	0.182	34.460***	8.781 ^{ns}		
Germany	0.164	0.105	0.160	0.329	0.180	938.052***	33.937***		
Local	0.845	1.153	0.855	0.580	1.011				
Price	-0.985	-0.481	-0.675	-1.097	-0.684	863.569***	63.397***		
None	-2.906	-2.565	-3.319	-3.077	-2.655	760.956***	517.012***		
Organic × buying experience	0.293	0.321	0.241	0.028	0.233	99.703***	14.118**	Weak AW > strong BD** Strong AW > strong BD** weak BD > strong BD** Strong BD > CG*	

Model 3: Milk choices moderated by attitude strength (N = 485; 21% of random choosers excluded; R² = 0.350)

Class size	74	68	73	79	89			
Intercept	-0.062	-0.153	-0.075	-0.011	0.110	5.176 ^{ns}		Weak AW < strong AW*
Organic	0.542	0.725	0.644	0.574	0.746	685.382***	11.591*	Weak AW < CG** Strong BD < CG*

(Continues)

TABLE 1 (Continued)

Prime topic	Animal welfare		Biodiversity		Strong	Control group	Wald (0)	Wald (=)	Wald (paired)
	Weak	Strong	Weak	Strong					
Packaging	0.357	0.340	0.269	0.282	0.292	182.518***	2.158 ^{ns}		
Germany	0.096	0.216	0.305	0.091	0.121	1,025.156***	8.509 ^{ns}		
Local	1.051	0.909	1.002	1.077	0.976	598.472***	17.698**		
Price	-0.506	-0.763	-0.781	-0.526	-0.599	361.270***	235.596***		
None	-3.607	-2.872	-4.057	-4.592	-2.683	192.238***		Weak AW < strong AW**	
Organic × attitude strength	0.180	0.529	0.375	0.438	0.446			Weak AW < weak BD* Weak AW < strong BD*** Weak AW < CG***	
Model 4: Milk choices moderated by buying experience (N = 485; 15% of random choosers excluded; R ² = 0.305)									
Class size	79	78	88	80	86				
Intercept	-0.030	-0.030	0.090	-0.010	0.069	1,453 ^{ns}		Weak AW < strong AW*	
Organic	0.410	0.555	0.495	0.568	0.760	608.488***	22.281***	Weak AW < strong BD* Weak AW < CG*** Strong AW < CG** Weak BD < CG*** strong BD < CG*	
Packaging	0.332	0.243	0.247	0.248	0.241	171.110***	2.876 ^{ns}		
Germany	0.075	0.199	0.211	0.120	0.160	1,018.013***	11.375 ^{ns}		
Local	0.852	0.771	0.890	1.011	0.944	614.971***	6.243 ^{ns}		
Price	-0.499	-0.559	-0.558	-0.430	-0.510				

TABLE 1 (Continued)

Prime topic	Animal welfare		Biodiversity		Control group	Wald (0)	Wald (=)	Wald (paired)
	Weak	Strong	Weak	Strong				
None	-3.902	-2.856	-3.303	-5.459	-2.900	457.985***	366.565***	Weak AW < strong AW***
Organic × buying experience	0.113	0.361	0.066	0.285	0.200	123.172***	32.179***	Weak AW < strong BD* Strong AW > weak BD*** Strong AW > CG* Weak BD < strong BD*** Weak BD < CG*

Note: Parameter values for random choosers are by definition fixed to zero; they were thus omitted. For the paired Wald tests, we reported only significant pairwise comparisons for the organic attribute and the interaction term. For the paired Wald tests, "animal welfare" is abbreviated with AV, "biodiversity" with BD and "control group" with CG.

* $p < .05$; ** $p < .01$; *** $p < .001$.

partly confirms H2a and H2b. The weak prime used was not sufficient, even when the topic had high online salience. Priming the low-salience online topic of *biodiversity* was not effective at increasing organic choices, even with a strong priming.

For the choice of milk (Models 3–4), the priming effects were not as hypothesized. Inconsistent with H1, the choice of *organic* was highest in the control group, thus suggesting no priming effects. In Model 3, the priming effects of weak *animal welfare* and strong *biodiversity* were significant but negative. The other priming conditions did not differ significantly from the control group. In Model 4, the choice of *organic* in all priming conditions was significantly smaller than in the control group. It therefore seems that the effects of priming online salient topics on organic choices differ between products, specifically between eggs and milk.

Consistent with H3, we found—for both the egg and milk choices—that having a strong attitude towards organic food (H3a) and longer buying experience (H3b) increased the likelihood of choosing *organic* across all conditions. The effect of the moderators was strongest when *animal welfare* was strongly primed, thereby suggesting that the effect of priming an online salient topic is highest among consumers with strong attitudes about the product in question and/or substantial buying experience.

4.2.2 | Policy acceptance

In addition to the choice experiment, we test the effect of the *animal welfare* and *biodiversity* primes on participants' acceptance of a policy regarding organic food. For this purpose, we used ANCOVA in SPSS 26 with priming conditions as a between-subjects factor and attitude strength and buying experience as covariates and moderators. We also include additional potential predictor variables as covariates (the perceived importance of animal welfare and biodiversity and media trust). The results are presented in Table 2.

Inconsistent with H1, the main effect of the priming on policy acceptance is not significant ($F[4, 1,113] = 1.452, p = .215$; Table 2). However, consistent with H3a, attitude strength significantly moderates the effect of the priming ($F[4,1,113] = 2.379, p = .050$). Planned contrasts revealed that, among the participants with the strongest attitudes towards organic food, all primes except the weak *animal welfare* prime ($t[1,106] = 1.659, p = .081$) significantly increased policy acceptance compared with the control group. Consistent with H2a, the strong *animal welfare* priming showed the largest priming effect (strong *animal welfare* prime, $t(1,106) = 2.689, p = .007$; weak *biodiversity* prime, $t(1,106) = 2.454, p = .025$; strong *biodiversity* prime, $t(1,106) = 2.216, p = .045$). Contrary to expectations (H3b), the interaction between priming conditions and buying experience is not significant.

5 | DISCUSSION

This study confirms that reminding consumers of a topic (i.e., priming) that is salient online can be a useful tool for boosting product

TABLE 2 ANCOVA for policy acceptance moderated by attitude strength

	B	SE	t	p
Policy acceptance moderated by attitude strength ($N = 1,118$; $R^2 = 0.279$, Ref = control group)				
Weak animal welfare	-0.122	0.075	-1.618	.105
Strong animal welfare	-0.168	0.071	-2.256	.024
Weak biodiversity	-0.102	0.076	-1.369	.174
Strong biodiversity	-0.135	0.074	-1.793	.065
Weak animal welfare × attitude strength	0.122	0.070	1.659	.081
Strong animal welfare × attitude strength	0.205	0.069	2.689	.007
Weak biodiversity × attitude strength	0.180	0.076	2.454	.025
Strong biodiversity × attitude strength	0.166	0.082	2.216	.045

Note: The significance of effects and standard errors (SE) was determined through bootstrapping with 1,000 bootstrap samples.

choices (in this case, organic eggs) and policy acceptance (in this case, policy supporting organic agriculture). However, although the study confirms our hypotheses regarding organic policy acceptance and also with regard to product choices when the product is organic eggs, it refutes our hypotheses when the product is organic milk.

The different results for eggs and milk are surprising because both products are among the most-purchased organic products in Germany.⁴ In addition, both eggs and milk are often among the first organic products that consumers start buying (Juhl et al., 2017). The priming topics selected (animal welfare and biodiversity) are both important reasons for why consumers purchase organic food in Germany (Federal Office for Agriculture and Food, 2020). We would therefore assume similar motives for buying organic eggs and organic milk. For example, in the U.S., Lusk (2011) did not find substantial differences in how food values explained the demand for organic eggs and milk. Studies have also found that German consumers are willing to pay the same price premium for eggs and milk produced using enhanced animal welfare standards (Heise & Theuvsen, 2017). Based on the current study, we can only speculate why the findings differ between the two products.

First, behaviours can be expected to be consistent with the prime only if consumers deem the prime relevant to the subsequent behaviour or judgement (Janiszewski & Wyer, 2014). It is possible—but

⁴Organic eggs and milk are among the top three organic products in Germany in terms of sales volume and account for 14.1% of total egg sales and 10.1% of total milk sales (Organic Food Production Alliance [BÖLW], 2020).

nevertheless surprising because milk and eggs are rather similar organic products—that participants did not perceive the two primed topics as being relevant to their choice of organic milk (DeCoster & Claypool, 2004). Thus, even if they cared about animal welfare and biodiversity as such, they might not have believed that buying organic milk was relevant to these issues. The finding by Janssen et al. (2016) that consumers value animal welfare-friendly husbandry systems in milk production and are willing to pay a price premium for such products speaks against this. Unlike for milk, there is a mandatory uniform labelling scheme for eggs in the EU providing information on the animal husbandry system (cage, barn, free-range, organic) (Commission Directive 2002/4/EC, 2002). This labelling scheme may have sensitized consumers to animal welfare issues in eggs and made them look out for animal-welfare cues when shopping. This is possibly reflected in our results regarding egg choices.

Second, our findings regarding organic milk might be due to the attributes spontaneously associated with buying organic milk (in the control group) being more important to consumers than the primed associations (animal welfare or biodiversity). Because the German market for organic milk is rather mature, participants might have had a large and strong associative network for organic milk. The participants' associative networks for organic milk might be dominated by more self-interested and potentially more meaningful motives (e.g., price, healthiness) rather than altruistic topics such as animal welfare and biodiversity. Some studies have found that priming personal gain is more effective than priming environmental gain when it comes to encouraging sustainable consumption behaviour (Chwialkowska & Flicinska-Turkiewicz, 2020). Milk might also be chosen in a more habitual way than eggs, and therefore with less contemplation of specific attributes because most consumers buy eggs less frequently than milk.⁵

Third, animal welfare and biodiversity might have been already very accessible in participants' minds when choosing milk, meaning that priming made no difference.

Fourth, according to psychological reactance theory, persuasion attempts can be perceived as a threat to personal freedom and then lead to a backfiring or boomerang effect (Brehm, 1966). If raising the awareness for animal welfare and biodiversity issues in food production is perceived more as a pressure in the context of milk than eggs, this could also account for the difference between the two product choice situations. However, it is not clear why more reaction should be produced when making choices involving organic milk products than when making choices involving organic eggs.

5.1 | Theoretical implications

As expected, priming a topic that is very salient online—such as *animal welfare*—is more effective than priming a topic that is less

salient—such as *biodiversity*. The fact that priming a more salient topic is more effective at activating a favourable attitude and influencing judgements and behaviour is consistent with the assumption that the online salience of topics reflects or is reflected in the strength of associations in the minds of consumers. It thus appears that the online salience of topics is an important aspect of consumers' "choice architecture" and that the priming of a salient topic can be an effective "nudge". In addition to the online salience of the prime, the effectiveness of priming appears to depend also on the situational salience of the priming or the strength of the prime. A stronger prime appears to be more effective than a weaker one, thereby suggesting that in order to be effective, the priming should not be too subtle. This is in line with a recent review of salience and priming interventions for healthier choices (i.e., providing relevant health information; Wilson et al., 2016), which found that salience nudges become more effective when combined with other nudges and interventions such as modifying the visibility, availability, and/or accessibility of choices. Furthermore, the effect of the priming on behavioural outcomes (i.e., organic food choices and organic policy acceptance) depends on attitude strength as well as experience with the behaviour in question. This is consistent with the assumption that the strength of the primed associative network matters for the susceptibility to priming and the likelihood of attitude activation.

5.2 | Managerial implications

An important practical implication of these findings for marketing and public policy is that it is useful to monitor online discussions. What is salient online is an indicator of popular political opinions. For example, policy makers involved in the introduction, adaptation and promotion of sustainability standards can use knowledge of online discussions to guide communication strategies aiming to increase the awareness and acceptance of the discussed issues.

Marketing communication can also benefit from monitoring online word-of-mouth. Communication could synchronize messages about relevant product attributes and product positioning with what is salient in relevant online forums in order to increase their effectiveness, thus building on the insight that salient topics are more accessible and can be primed more easily. For example, information provided on the product packaging can be matched with salient topics. Communicators could also try to make specific topics more salient. The present text-mining and priming studies have demonstrated that biodiversity is currently not very salient in German consumers' online environment. Priming this topic therefore does not influence consumer choices and behaviour to a great extent. However, biodiversity is critical to the resilience of our earth system (Steffen et al., 2015) and is a core benefit of organic farming, which has shown clear advantages over conventional farming in this respect (Tuck et al., 2014). Marketers and policy makers could thus highlight more such verifiable benefits of organic production in order to mobilize the agenda-setting power of the media (Thøgersen, 2006). News media can be an effective channel for marketers and policy makers

⁵An analysis of German household scanner data from Gesellschaft für Konsumforschung (GfK) shows a higher monthly frequency of milk purchases ($M = 3.01$, $SD = 2.44$; 2016–2017) than that of egg purchases ($M = 2.12$, $SD = 1.33$; 2012–2014).

to bring issues into the public debate and onto their agenda and thus to potentially influence sustainable consumption behaviour (Bellotti & Panzone, 2016).

5.3 | Limitations and directions for future research

Like many others, this study is based on hypothetical choices in an online questionnaire with no possibility to control actual behavioural outcomes of our interventions. It thus suffers from the usual limitations in terms of assessing the ecological validity of findings in the “real world”. We increased the face validity of findings using a between-subjects design and including two very different outcome variables. However, future research should study the effects of online salience on real behaviour. For example, by combining data on the online salience of topics and market data (e.g., Thøgersen, 2006).

Furthermore, priming of specific topics comes with uncertainty in the selection of these topics and how they are related to the behavioural outcome measures as we discussed above in relation to the different effects of the priming on the choice of eggs and milk. Future research should analyse more products and product categories in order to further investigate possible product or category-specific differences in the effectiveness of priming based on online salience. In addition, this relationship could be investigated for different sources of UGC online, and, not least, its applicability to other cultural contexts because the consumer perception of organic food is country-specific (Marreiros et al., 2021).

We also have no data to document whether or the extent to which UGC online is representative of the views and salience of topics in the general population (and/or specific sub-populations). Future research should investigate both the overall representativeness of UGC online and possible contingencies (e.g., the source and online platform) by combining text mining of UGC online and opinion polls, for example.

6 | CONCLUSION

The present study contributes insights on how understanding what is salient in online environments and the text mining of UGC online can be used to promote sustainable consumption behaviour such as buying organic food. It provided new insights regarding the link between the online salience of topics and behavioural judgements, decision-making and behaviour. However, more research is needed on the benefits of priming salient online topics in communications promoting products or causes. Although it appears that both the online salience of topics and the strength of the priming matter, our results regarding product choices are still ambiguous.

Nevertheless, our findings support the common perception that what goes on in online environments, including the salience of topics and online word-of-mouth, actually influences consumer judgement and choices offline. When explicitly elicited, German consumers rate the importance of both the included attributes (animal welfare and

biodiversity) as high. In a recent consumer survey, 95%/85% of participants have found animal welfare/biodiversity to be important in the context of organic food (Federal Office for Agriculture and Food, 2020). Survey research thus suggests a far smaller difference in importance between the two topics compared with the difference in natural salience as attested by our text-mining study in which animal welfare was found to be far more salient to users than biodiversity. Thus, despite the mixed effectiveness of the priming for the choice of organic in different product categories, our results show that online salience matters. Priming with a more salient topic caused more pro-organic behaviour than priming with a less salient topic. The detection of the power of online “chatter” to activate product-related knowledge and attitudes means that we should listen more to people’s online expressions in order to find out what are currently salient issues and then use this insight to promote desired choices and behaviour. This is relevant not only with regard to products but also with regard to acceptance of policy to promote desired behaviour.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data is not available.

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APPENDIX A

Sample characteristics

Variables	Sample
N	1,118
Gender (%)	
Female/male	50.9/49.1
Age (%)	
18–20	4.7
21–29	14.0
30–49	36.0
50–59	22.5
60–64	9.5
65 and more	13.3
Schooling (%)	
Less than high school	1.8
High school (9 years)	16.5
High school (10 years)	45.9
High school (12/13 years, Abitur)	35.9
Professional education (%)	
No professional education	17.1
Apprenticeship	63.2
Bachelor's degree	4.7
Master's degree/diploma or higher	14.9

Variables	Sample
Household size (mean)	2.35
Children (<18 years) in household (mean)	1.45
Household income (%)	
Under 900€	7.6
900–1299€	10.1
1300–1499€	6.4
1500–1999€	10.6
2000–2599€	16.2
2600–3199€	11.8
3200–4499€	16.6
4500–5999€	8.5
6,000€ and more	3.8
No answer	8.4

APPENDIX B

Means (M) and standard deviations (SD) for all self-reported variables (N = 1,118)

Variables	Type	M (SD)
<i>Policy acceptance</i>		
If there was a vote on the following possible political measure, would you vote in favour or against this measure? Receiving agricultural subsidies is to more strongly depend on the compliance with environmental, climate protection and animal welfare criteria. Thus, in particular organic farmers will receive more support as organic agriculture abides by higher environmental and animal welfare standards compared with conventional agriculture	1 = would definitely vote against – 5 = would definitely vote in favour	4.28 (0.93)
<i>Attitude valence</i>		
How do you feel about organic food?	–8 = extremely oppose – 8 = extremely favour	3.21 (3.93)
<i>Attitude strength</i>		
How important is organic food to you?	7 items, Cronbach's alpha = 0.802	27.18 (6.32)
How strongly do you identify with organic food?	1 = not important – 7 = important	4.64 (1.57)
How representative of your values is your attitude towards organic food?	1 = not representative – 7 = representative	4.15 (1.62)
How sure are you of your positions regarding organic food?	1 = not sure – 7 = sure	4.46 (1.63)
How sure are you of your positions regarding organic food?	1 = not sure – 7 = sure	4.99 (1.34)

Variables	Type	M (SD)
How informed do you feel about organic food and its production?	1 = not informed - 7 = informed	4.36 (1.35)
How likely are you to change your attitude towards organic food?	1 = unlikely - 7 = likely	4.57 (1.39)
Buying experience		
For how long have you been buying organic food?	1 = never, 2 = for less than 3 months, 3 = for 3-6 months, 4 = for 7-11 months, 5 = for 1-2 years, 6 = for 3-5 years, 7 = for more than 5 years	5.08 (1.86)
Media use		
	9 items, Cronbach's alpha = 0.719	35.73 (9.01)
How often do you watch TV?	1 = never, 2 = less than once a month, 3 = 1-3 times a month, 4 = 1-2 times a week, 5 = 3-6 times a week, 6 = 1-3 times a day, 7 = more than three times a day	5.54 (1.40)
"How often do you listen to the radio?"	see above	4.98 (1.79)
How often do you read news in print?	see above	3.87 (1.86)
How often do you read news online?	see above	5.12 (1.65)
How often do you read reader comments on news websites?	see above	3.65 (1.94)
How often do you use social networks (e.g., Facebook)?	see above	4.82 (2.20)
How often do you create posts in social networks?	see above	2.80 (1.93)
How often do you read online question-and-answer forums?	see above	2.85 (1.74)
How often do you create posts in online forums or news websites?	see above	2.10 (1.62)
Media trust		
If you think of a news media outlet that you use frequently, do you think it can generally be trusted?	1 = cannot be trusted - 5 = can be trusted	3.50 (1.00)
Theme importance		
How important is animal welfare with respect to organic food and its production to you?	1 = not important - 7 = important	5.83 (1.35)
How important is biodiversity with respect to organic food and its production to you?	see above	5.20 (1.46)

APPENDIX C

Priming items

"Included here are headlines regarding topics that have been publicly discussed recently in Germany. The headlines were picked randomly from news websites by a computer. For each topic, please indicate whether you have read or heard about it." (answer options: Yes, No, I am not sure)

Weak animal welfare prime

1. Factory farming in Germany: Only slow progress in animal welfare
2. Why the refugee influx is increasing again
3. Companies are becoming more family-friendly
4. Hard Brexit puts British economy at risk
5. Autonomous driving: Who is liable for traffic accidents?
6. Education experts advocate a centralized school-leaving certificate in Germany
7. Smartphones frequently affected by data security loopholes

Strong animal welfare prime

1. Factory farming in Germany: Only slow progress in animal welfare
2. Why the refugee influx is increasing again
3. Companies are becoming more family-friendly
4. Animal husbandry: Many animals—little space
5. Autonomous driving: Who is liable for traffic accidents?
6. Education experts advocate a centralized school-leaving certificate in Germany
7. Animal-friendly husbandry: Stricter animal-welfare standards in organic farming

Weak biodiversity prime

1. Biodiversity: Almost a third of wild plants are endangered
2. Why the refugee influx is increasing again
3. Companies are becoming more family-friendly
4. Hard Brexit puts British economy at risk
5. Autonomous driving: Who is liable for traffic accidents?
6. Education experts advocate a centralized school-leaving certificate in Germany
7. Smartphones frequently affected by data security loopholes

Strong biodiversity prime

1. Biodiversity: Almost a third of wild plants are endangered
2. Why the refugee influx is increasing again
3. Companies are becoming more family-friendly
4. Organic farming: a first step to more biodiversity
5. Autonomous driving: Who is liable for traffic accidents?
6. Education experts advocate a centralized school-leaving certificate in Germany
7. Why insects are steadily disappearing

Control condition

1. The number of single households in Germany is increasing
2. Why refugee influx is increasing again
3. Companies are becoming more family-friendly
4. Hard Brexit puts British economy at risk
5. Education experts advocate a centralized school-leaving certificate in Germany

6. Smartphones frequently affected by data security loopholes

De-briefing of participants: The headlines presented were actually published on online news websites. However, they were not randomly selected by a computer. Each participant was randomly attributed to a group of pre-selected headlines.