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Barriers and methodology in transitioning to sustainability: Analysing web news comments concerning animal-based diets

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ABSTRACT

Global environmental goals require immediate action to combat climate change and biodiversity loss. Yet, despite growing public awareness, policies adopted, and research undertaken, societies are far from transitioning to sustainability. The barriers to a transition are complex and diverse. Previous research identified motivational factors that impede societal change: knowledge, values, self-interest, structural problems, concepts of normality and emotions. The aim of this paper is to investigate if these factors are reflected in comments about meat and animal-derived product consumption. In order to overcome a number of shortcomings of frequently used social research methods (e.g. surveys, focus groups, interviews), we adopt a qualitative content analysis of web news comments. We choose this approach because content analysis is an unobtrusive research method which provides undistorted and hence valuable insights into the attitudes/motivations/emotions etc. of the commentators. The results show that self-interest, concepts of normality as well as emotions such as fear, frustration, anger and lacking trust seem to make a transition to sustainability very difficult. Values appear to both impede and enable sustainable behaviour while knowledge only plays a minor role. These factors in combination with the interdependence of all actors of society might explain why achieving global environmental goals is so very challenging.

1. Introduction

Global environmental challenges like the biodiversity crisis, climate change, soil degradation and disrupted nutrient cycles are interlinked with food production and human diets and thus human behaviour. For example, soils, which are the basis of food production, are threatened by soil compaction through heavy machinery, excessive fertiliser application and lacking crop diversity. These pressures can induce soil erosion and ultimately negatively affect food production and ecosystems (Alewell et al., 2020; Borrelli et al., 2020; Evans et al., 2020). The loss of biodiversity and climate change (arguably) sit high on the political agenda, and are on the mind of many people. A Eurobarometer survey finds that half of all respondents thought biodiversity is threatened (European Commission, 2019). A survey on climate change reveals that nearly every fourth European citizen considers climate change to be one of the single most serious problem facing the world today (European Commission, 2020a). On the political agenda of the EU, climate change appeared in the 1980s (European Commission, 1988; Delreux and Ohler, 2019). In 2018, the European Commission set out its vision to be carbon-neutral by 2050 and the European Climate Law promises to enshrine carbon-neutrality into EU law. Besides, in the Farm to Fork Strategy, the Commission commits to 'help reduce the environmental and climate impact of animal production', and to promote sustainable diets (European Commission, 2020b, pp. 8, 13).

In spite of the above, even though greenhouse gas emissions in the EU have decreased by 21% between 1990 and 2017 – yet, partly due to structural changes form energy intensive industries towards an extension of the service sector – among others, N_2O emissions from agricultural soils have increased (EEA and FOEN, 2020; Felbermayr and Peterson, 2020, pp. 6–8). Above all, the emission downward trend is not even remotely sufficient to achieve the reduction targets established by the European Commission (Delreux and Ohler, 2019; Eurostat, 2020a, p. 2). The agricultural sector in particular – covering nearly half of the total land area in the EU (Eurostat, 2019, pp. 19–20) – has a significant impact on the environment. While agriculture performs multiple functions including, in addition to food production, the provision of

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landscapes, farm biodiversity and rural development (see e.g. Batáry et al., 2015; Huang et al., 2015), the negative impacts of the sector have given rise to concerns. Issues include continuously declining wildlife numbers (EEA, 2020; Reif and Vermouzek, 2019; Seibold et al., 2019), a decline in permanent grasslands (Pe'er et al., 2014, p. 1090) as well as the degradation of soils and peatlands (see e.g. Borrelli et al., 2018; IPBES, 2018; Stubenrauch, 2019). Within the agricultural sector, studies highlight the resource intensity and environmental issues associated with livestock production (Leip et al., 2015; Mottet et al., 2017; Pendrill et al., 2019; Weishaupt et al., 2020). Yet, these effects are complex in that the impacts depend on many factors such as the livestock production system, temperature, soil type and soil quality (Garnett et al., 2017; Malm et al., 2020; Smith et al., 2013). Still, multiple studies conclude that a drastic reduction of the consumption of animal-derived products – alongside cutting down fossil fuels to zero in all sectors – is required to achieve international environmental goals such as the targets of the Paris Agreement and the goal to stop biodiversity loss in the Convention on Biological Diversity (e.g. Bowdren and Santo, 2019; Clark et al., 2020; Cusack et al., 2021; Ekardt, 2020; Stoll-Kleemann and O'Riordan, 2015; Weishaupt et al., 2020).

However, in spite of the responses of the survey participants, the policy instruments adopted or proposed and the necessity to reduce the consumption of animal-derived products, the consumption of these products in the EU remains relatively stable since 2000 (EEA, 2017; Weishaupt et al., 2020). Similarly, meat production has stayed at a high level since 2010 (Eurostat, 2020b, pp. 53–55). Henceforth, there appear to be factors that stand in the way to transitioning towards sustainability.

While there are many behaviours which are not in accordance with the above-mentioned environmental goals, e.g. long and short distance flying, the present article focusses on meat and animal-derived products consumption and aims to identify the causes of (this) non-sustainable behaviour or putting it differently, to shed light onto the barriers that stand in the way to achieve individual and societal change. We investigate if the motivational factors (of consumers, voters, politicians, farmers, etc.) identified in previous research (knowledge, values, self-interest, structural problems, concepts of normality, emotions) are reflected in the present case. To this end, we analyse web news comments in response to an article which discusses the necessity to reduce meat and animal-derived products consumption – and livestock farming more broadly due to global climate change and biodiversity loss. We choose this approach because content analysis is an unobtrusive research method which provides undistorted and hence valuable insights into the attitudes/motivations/emotions etc. of the commentators. We defined the following research questions:

(1) To what extend do commentators agree/disagree with the article's argument to reduce the consumption of meat (and animal-derived) products in light of pressing global environmental issues?
(2) Do common themes emerge across the comments? What are the defining features of these themes?
(3) To what extent do these themes reflect the motivational factors (knowledge, values, self-interest, structural problems, concepts of normality, emotions) as expressed in the comments?

The article is structured as follows: The section hereafter introduces the theoretical framework and provides a literature review on conditions for transitioning to sustainability and studies on web news comments. Section 3 describes the method adopted. Results and discussion follow before we offer conclusions including the limitations of our study.

2. Theory and literature review

2.1. Human motivation and the preconditions for transforming towards sustainability – and methodological frictions of researching it

Analysing the preconditions of societal change will only succeed if the many disciplines contributing to behavioural science (sociology, psychology, sociobiology, economics, etc.) are looked at together to form an overarching theory of individual and collective change (e.g. Costanza, 2014; Fazey et al., 2018; Stoll-Kleemann and O'Riordan, 2015). Generally speaking, the emergence of unsustainability is a prime example of the diverse motivational factors of and the conditions for social change. In particular, complex interactions of various actors that culminate in vicious circles e.g. of politicians, voters, business persons and consumers play a central role – alternatively, individuals can be condensed into 'structures' such as political and economic power (Greve, 2015; Stoll-Kleemann and O'Riordan, 2015). Ekardt (2020) has put forward the thesis – against other voices in sociology – that individual and structural aspects may be simply two sides of the same medal, since the distinction does not really work, and structures always consist of individuals. In sum, the motivational factors and the conditions for societal change are reflected within an individual and on a structural level.

The complex interactions and barriers for sustainability do not arise primarily from a lack of knowledge of individuals. In fact, the relevance of knowledge to behaviour is sometimes overestimated. Besides, factual knowledge does not prove normative objectives right or wrong (Ekardt, 2020; Stoll-Kleemann and O'Riordan, 2015; skipped in: Otto et al., 2020). Other – and frequently more – important factors (for voters, consumers, politicians, farmers, etc.) include self-interest, path dependencies, problems with collective goods, and values. These factors base their considerations on individuals who act consciously and calculatingly throughout. Yet, by the same token, irrational and unconscious or semi-conscious factors that influence the behaviour of individuals are sometimes overlooked. Such factors are concepts of normality (not to be mistaken for values) and emotional factors such as convenience, habits, a lack of orientation in spatio-temporal distance, denial, a lack of thinking in complex causalities, dissonance of talking and acting as well as striving for recognition (Ekardt, 2020; Fazey et al., 2018; Graça et al., 2014; Loschelder et al., 2019; Stoll-Kleemann and O'Riordan, 2015). Taken together, for the present analysis, the following six motivational factors are relevant (Fig. 1).

In addition to these motivational factors, lacking sustainability is rooted in a mixture of biological, cultural (including economic, e.g. capitalism-related), biographical and external factors (Costanza, 2014; Ekardt, 2020; Otto et al., 2020; Stoll-Kleemann and O'Riordan, 2015). Consequently, social change in general and transforming towards sustainability in particular appear to require the interaction of different actors. This change requires influencing those motivational factors which can be influenced at all (Ekardt, 2020; Fazey et al., 2018).

Beyond the motivational factors, a number of methodological challenges are inherent to transformation research. The findings discussed above stem from a variety of disciplines, schools and methodological approaches. They are lined up in a terminology that is sometimes used in literature (Ekardt, 2020; Garske, 2019; Hennig, 2017; Stubenrauch, 2019). Generally speaking, behavioural drives as mental factors (e.g. towards sustainability) are very difficult to grasp formally. Furthermore, every methodological attempt such as surveys or experiments threatens to fail due to the enormous complexity of the underlying transformation or remains fictitious rather than capturing the reality. These problems are of a fundamental nature, and they apply equally to experiments and surveys – whether quantitatively or in. e.g. interviews with a few people (Ekardt, 2020; Hamann, 2014; skipped at Lang et al., 2014; Tapia--Fonllem et al., 2013). This is why the findings above represent an overall sample of the different methodologies, schools and disciplines. The methodical difficulties occur intensively on sustainability issues because

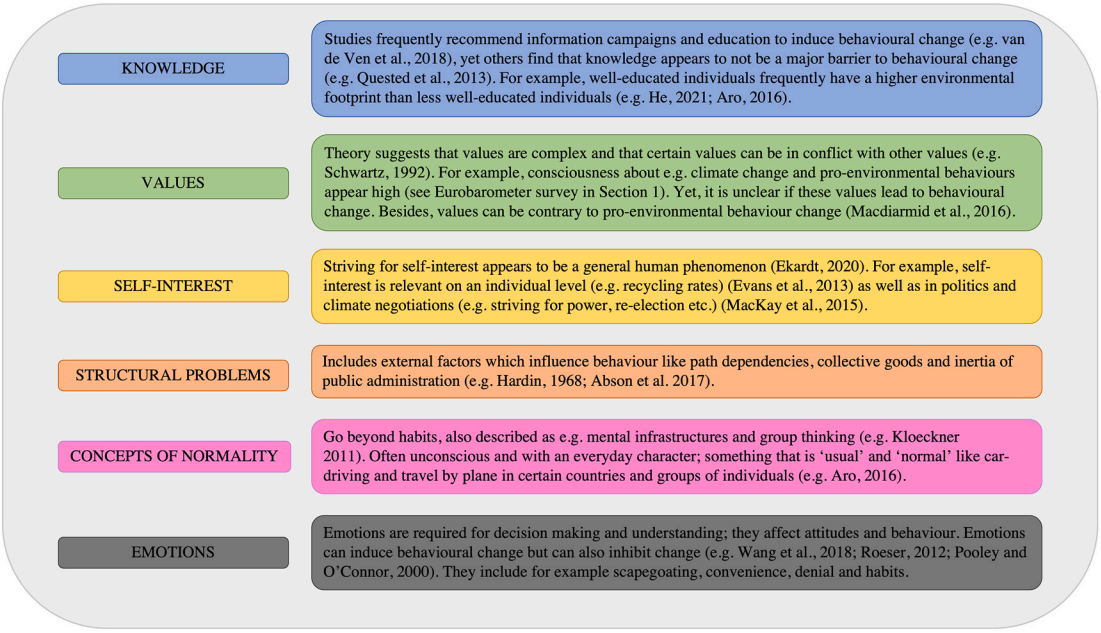

Fig. 1. Overview motivational factors.

the complexity is particularly high and the motives that drive individuals away from the required change are very strong. Before this background, the present analysis chooses a less well-known approach as an additional tool to contribute to a potential triangulation of different methodologies. We analyse web news comments to review the findings on conditions to transforming to sustainability and to possibly overcome some of the discussed methodological challenges.

2.2. *Web news comments in previous research*

Web news comment spaces have been the subject of research. For example, studies analyse the relationship between article topic and comment activity. Results show that articles which cover 'hard content' (e.g. economics, politics) attract more comments compared to articles with 'soft content' (e.g. gossip, human interest stories) – with the exception of sports (Coe et al., 2014; Riskos et al., 2019). More precisely, for example, where the content of the article is geographically close to the readers, e.g. in the same country, and where the reported news has an impact on, e.g. the own (social) group, comment participation and interactivity increase (Weber, 2014). At the same time, opinion tendencies of an article do not affect user activity in comparison to neutral contributions. Instead, there is a relationship between article topic, the level of incivility and discussion quality (Brückner and Schweiger, 2017). Besides, a study on Russian online news outlets discusses, among others, the diverging importance of attention given to certain topics by the media on the one hand and the audience on the other (Koltsova and Nagornyy, 2019). Larsson (2018) assesses the themes of the comments of frequent commentators as well as those comments which have gained 'popularity' (number of 'likes'). Related to that, comments are analysed to understand if they add new information to the topic of the news (Blom et al., 2014; Paskin, 2010), and if they impact the perceived quality of an article (Prochazka et al., 2018). Hence, these studies provide insights into the comment activity and contents as well as the relationship of the comments with the (topics of) web news articles.

Researchers have also used web news comment spaces to shed light on commentator behaviour. To this end, either the comments or the commentators themselves have been the subject of the study. For example, with regard to the latter, Chung (2019) investigates the peer influence of web news comments on the attitudes and perceptions towards the news subject of subsequent readers. The study applies an online survey which containes an article and pre-selected reader comments after which the participants were asked questions about their attitudes etc. towards the subject of the web news article. Other researchers used an online questionnaire to investigate personality traits and motivations of online news commentators (Springer et al., 2015; Wu and Atkin, 2018), to highlight that reading news comments can influence personal opinions under certain conditions (Lee and Jang, 2010), and the relationship between e.g. anonymity and likelihood of opinion expression (Wu and Atkin, 2018). Besides, surveys are frequently applied to shed light onto the demographics of commentators (Bergström, 2008; Blom et al., 2014; Meyer and Carey, 2015; Van Duyn et al., 2019; Wu and Atkin, 2018). While surveys have the potential to include lurkers, i.e. people who read but do not participate in discussions (Springer et al., 2015), it has been acknowledged that, as indicated earlier, self-reported perceptions limit the data quality as opposed to observed behaviour and that survey questions might not capture the full picture of what is sought for (Bergström, 2008, p. 72; Ekardt, 2020; Van Duyn et al., 2019, p. 11). In sum, these studies target commentators through (online) surveys and questionnaires to gain insights into their behaviour and demographics.

Rather than focussing on *commentators*, other studies analyse web news *comments* to comprehend commentator behaviour. For example, conclusions are drawn on the expression of (un-)civility of commentators and how others respond to uncivility (Blom et al., 2014; Brückner and Schweiger, 2017; Coe et al., 2014; Paskin, 2010; Santana, 2015). In addition, and closely related to the subject of the present article, Woods et al. (2018) investigate the moral responses of web news commentators to climate change. To this end, the researchers chose three web news articles of British newspapers which discuss the fifth IPCC report and analyse the first 100 comments. Based on a theory on moral disengagement, they then applied a quantitative thematic analysis of the comments informed by Braun and Clarke (2006). In line with the methods of these studies, the present study applies a content analysis of web news comments to identify the barriers of non-sustainable behaviour of commentators.

3. Method and material

3.1. Applying web news comment analysis as additional method

Web news comment analysis offers a number of advantages when studying conditions to transitioning to sustainability. In general, content analysis (of web news comments) can be used to learn something about the people who have produced the material. It is assumed that 'behavioural patterns, values, and attitudes found in this material reflect and affect the behaviours, attitudes, and values of the people who created the material' (Berger, 1998, p. 23). Besides, qualitative content analyses allow to make statements about the social conditions in which statements/comments are made. This includes for example values, conceptions of normality and knowledge as well as self-interest and emotions (Ekardt, 2020; Wegener, 2005, pp. 206–207). In addition, because participation on the internet is linked to life offline, online studies offer new possibilities to study phenomena that would otherwise be hard to study directly (Kozinets et al., 2014, pp. 264–265; Lee, 2000, p. 116). For example, performing a content analysis of web news comments allows to access a wide population which would otherwise not be available (Kozinets et al., 2014, p. 263; Lee, 2000, p. 117; Marotzki et al., 2014, p. 451). More precisely, user-generated content – like web news comments – can function as an easily accessible source to track discussions and understand the behaviour of people (Gelfgren, 2016, p. 95; see on documents in general Brosius et al., 2012, pp. 136–137). In fact, web news comments 'are rife with evaluations, interpretations, and subjective explanations' (Walther and Jang, 2012, p. 9).

Studies on web news comments make use of different forms of content analyses. For example, researchers seek (inductive) categories from recurring themes in the comments (Larsson, 2018). Others apply a semi-automated quantitative content analysis supplemented by a qualitative examination of news comments (Koltsova and Nagornyy, 2019) while in another study, researchers use quantitative content analysis only (e.g. Blom et al., 2014). These studies, as in the present study, have in common that the material has not been produced at the request of the researcher. Therefore, the content is non-reactive which means that the commentators are not influenced by knowledge about the usage of their comments in a research project (Berger, 1998, p. 26; Bryman, 2004, p. 196; Grønmo, 2020, pp. 208, 214; Marotzki et al., 2014, p. 458) and hence offers unobtrusive insights for the analysis on human behaviour. Therefore, such an approach seems useful as additional tool – besides surveys and experiments – to study the conditions to transitioning to sustainability. It may also be seen as a kind of participant observation (Ekardt, 2020).

3.2. Research design – ZEIT ONLINE as research context

The subject of the qualitative content analysis carried out here are the comments written in response to one web news article in the German ZEIT ONLINE published on December 26, 2018 (https://www.zeit.de/wirtschaft/2018-12/fleischkonsum-umweltschutz-klimawandel-tierhaltung). It is written by Felix Ekardt. ZEIT ONLINE is the online version of ZEIT which is one of the big German national newspapers. The article analyses high meat (and animal-derived products) consumption in Germany and industrialised countries before the background of progressing climate change and the global biodiversity crisis. The author recalls the environmental issues associated with livestock farming including its substantial resource consumption and overfertilisation. The article discusses how these issues contribute to climate change and relate to global food security. It then highlights the advantages of reduced livestock numbers for climate and biodiversity and subsumes that eating less meat, rather than having *only* vegetarian and vegan diets, is a useful behaviour to address the environmental issues. A section on animal welfare follows which, amongst others, highlights the contradictory relations between humans and animals ('love pets, eat pigs'). Thereafter, the news article contains a passage to paternalism and common misunderstandings. It argues that adopting policy instruments to reduce meat intake is *not* paternalism because liberal states have to protect all individuals – including victims of climate change. It sums up by highlighting the interwovenness of politicians, employees, consumers and big companies, and how this challenges the introduction of policy instruments which limit animal production. The article concludes by stating benefits of eating no meat (and less animal-derived products) including health benefits and environmental protection.

In order to comment at ZEIT ONLINE, individuals have to register. Commentators have to provide an email address and a username. Individuals can offer further details including gender, age, address, occupation etc. if they wish to do so. The terms of use of ZEIT ONLINE include a netiquette. Comments are subject to review, shortening and editing. Discriminatory, racist or pornographic contributions are not tolerated (https://www.zeit.de/administratives/agb-kommentare-artikel). If a comment is deleted, ZEIT ONLINE puts the information of deletion in its place. In the comment section, individuals can post new comments and/or respond to previous comments. Hence, participants can directly interact with other participants (Walther and Jang, 2012, pp. 4–5). Data analysis started in July 2020. At that time, 622 comments were published with the latest comment posted in April 2019.

In the present study, the comments were selected prior to the analysis. Because it was not in the scope of the study to analyse all comments, we picked the comments that directly respond to the article. We assume that there is one user behind each account and do not factor in the possibility that one person might have created multiple accounts to, e.g. have a greater impact on the discussion. In total, 116 comments respond directly to the article and 506 comments respond to preceding comments (see on comment sampling, e.g. Toepfl and Piwoni, 2015; Woods et al., 2018). To analyse the data, we made use of Microsoft Excel and manually coded and categorised the data. We decided to not perform an automated content analysis (section 3.1) because this would have limited our ability to capture, e.g. latent content and the overall meaning of the texts (Brosius et al., 2012, p. 168; Gibbs, 2014; Grønmo, 2020, pp. 213–214).

As indicated before, rather than performing open coding only where the text material forms the basis for the choice of codes (see e.g. Bryman, 2004, pp. 408–411; Grønmo, 2020, pp. 301–303; Lindlof and Taylor, 2002, pp. 215–216), the analysis of the comments merges open coding with 'theory-driven' coding to comprehensively gain the relevant information from the data. We began with open coding to capture the idea of the comments (Goulding, 1999; Vollstedt and Rezat, 2019, pp. 86–87). Having gained a good overview of the content, we then analysed the codes with a focus on the motivational factors. In this second step, coding was performed with certain ideas/questions in mind (Braun and Clarke, 2006, pp. 84, 88–89; Toepfl and Piwoni, 2015). Precisely, coding was informed by our previous research on conditions for transitioning to sustainability (Ekardt, 2020, Chapters 2.2–2.5). The motivational factors (self-interest, knowledge, values, emotions, structural problems, i.e. collective goods/path dependencies, concepts of normality) served as categories to which codes were oriented to (see on predefined categories Grønmo, 2020, p. 212). Nevertheless, acknowledging that pre-existing categories should not conceal or overshadow themes that are in the material, yet outside the existing theory (Braun and Clarke, 2006; Lindlof and Taylor, 2002, pp. 214–215), we kept our eyes open for codes outside the theoretical framework (similar here: Woods et al., 2018) and included them into the analysis. Thus, we sought codes, both from the comments and the theory.

Multiple codes could be allocated to one comment. Thereafter, we subsumed the codes into themes such as 'necessity of livestock and meat', 'references to other sectors or countries' and 'pleasure and normality'. Thus, one comment could be assigned to multiple themes. We then allocated these themes to the predefined motivational factors (knowledge, values, self-interest, structural problems, concepts of normality and emotions).

4. Results and discussion

To begin with, many people made use of the comment space. 90 different commentators participated in the creation of the 116 comments. Where a commentator posted more than one comment, either two or three comments were posted. 81 commentators have a public profile which contains, among others, the individual comment activity (i.e. total of posted comments) at ZEIT ONLINE. The number of comments ranges from 1 to 18.592. On average, the 81 users posted 1.673 comments which indicates that the majority of the individuals appears to comment frequently on this web news site (Section 2.2). No comment was marked by ZEIT ONLINE as being in breach of the netiquette (Section 3.1).

Looking at the first research question, Table 1 below highlights that the 116 comments can quite evenly be divided into those comments in support of and against the argument of the article, and those with an unclear position.

The following section analyses the themes that are discussed across the comments as defined in the second research question. The themes are (A) 'responsibility and critique of politics/system', (B) 'references to other sectors or countries', (C) 'paternalism and limits to freedom', (D) 'accessibility and affordability', (E) 'pleasure and normality', (F) 'necessity of livestock and meat', and (G) 'scepticism towards arguments of the article'.

(A) *Responsibility and critique of politics/system:* Comments frequently refer to politics and markets (although the article underlines the interdependencies of farmers, enterprises, politicians, consumers, voters, lobbyists, etc.). The comments cover different levels of public policy. Starting from the inability of the democratic system to create change and issues of 'politics' and 'the state/the government', critique also addresses particular parties and single politicians. Examples include blaming politics for not being interested in animal welfare, lacking enforcement of rules as well as criticising 'silly' agricultural ministers, the grand coalition and Chancellor Merkel for tolerating large inputs of pesticides and antibiotics. Green parties as much as the liberals are under attack for their inaction and lacking braveness. Moreover, attention is drawn to the interwovenness of politics and interest groups. This includes the interdependence of the German federal ministry of agriculture and the agricultural industry as well as their whitewashing and keeping quiet about the issues of intensive animal farming.

Critique is also voiced over the 'liberal state'. In general, it is argued that restricting the consumption of animal-derived food and meat products exceeds the competencies of liberal states. Viewed from the other angle, commentators see their freedom endangered. For example, one person goes as far as to state that '[t]he state can use various arguments (climate change, animal welfare …) to impose restrictions on its citizens ultimately resulting in a prohibition of the life'. At the same time, meat consumption is perceived to be an element of free decision making. According to this perspective, liberal states are not allowed to impose prohibitions. If they did so (e.g. prescribe the diets of citizens), they are simply not liberal.

Related to the above, the devil is seen in capitalism; individuals are victims of the capitalistic system. For example, commentators portray consumers as victims of advertisement (also found by: Pereira Heath and Chatzidakis, 2012). Others conclude that the general public has to pay for environmental damages while the meat industry collects all profits. In particular, comments frequently refer to the responsibility of (other) actors in the market system – including 'the capital'. For example, one comment states '[t]he capital does not care about the environment and people' while another argues that the aim of intensive animal farming is not the production itself but the concentration of profits. Another topic is (mass) consumption. Some find that the market system is responsible for and cannot exist without mass consumption. Others defend consumption. According to this argument, the real issues are the greed of supermarkets and producers as well as the production methods (e.g. too many antibiotics). Moreover, comments portray the market system as existing by itself rather than being related to e.g. consumer demand, and ultimately themselves (see also here: Graça et al., 2014, p. 757) (Section 2.1).

Multiple commentators propose policy instruments to address the issues related with animal-derived and meat products. These proposals are made by both, commentators who are critical towards and in support of the argument of the article. In doing so, commentators attribute responsibility to the state. Moreover, these proposals do not target individuals directly. Proposals include for example (1) state restrictions on everything that harms the environment, (2) provisions against meat consumption, (3) redirecting money to producers with good husbandry conditions, and (4) strict requirements for meat production. In addition to these policy proposals, commentators make many other proposals outside the policy sphere. They range from introducing a school subject 'ecology' to producing only as much as is being consumed. People should switch to vegan, vegetarian or low-meat diets while others propose to move back to consuming the entire animal, consuming regionally, sustainably sourced meat from wild animals (i.e. feral pigs and deer). Addressing the farm level, in order to close the nitrogen cycle, in the long-term, sewage sludge should be utilized to recover nitrogen from food products and animals should be fed on pastures (rather than corns and soy). Besides, while a comment calls for making animal husbandry and meat production ecological, the commentator does not see the necessity for less meat consumption to solve environmental issues.

(B) *References to other sectors or countries:* Some commentators establish references to other sectors, fields, and countries, e.g. the industrialising countries. For example, commentators repeatedly find it more effective for environmental protection to address flying and (cruise) shipping. Simultaneously, they play down the effects of agricultural production on the environment and climate (see also: Graça et al., 2014, p. 758). For instance, one commentator points towards the small share of global greenhouse gas emissions which is associated with the agricultural sector. It would thus be more effective to start elsewhere. Similarly, one commentator argues '[c]ompared to the increasing global population, the effect of reducing meat consumption is negligible'.

Connected to the above, critique and uncertainty is voiced over the environmental (and social) footprint of 'exotic' vegan products. Commentators refer to the 'madness' of importing many vegan products or their cultivation in heated greenhouses in Germany. Others argue that the import of vegan products into the EU, in addition to a poor carbon dioxide balance, pushes people in the producing countries into poverty and towards the consumption of industrially produced low-quality food. These comparisons suggest

Table 1
General tendencies of comments.

Shift to sustainable diet	Number of Comments	Content
Pro	40	• Explicit calls to reduce/minimise the intake of meat (and animal-derived products) • Proposals which enable shifting diets to become sustainable
Contra	38	• Clear opposition to calls to reduce/minimise the intake of meat (and animal-derived products)
Unclear	38	• Partly contradictory statements which contain pro and contra elements • Topics not relevant for the discussion

that vegan diets and diets without/less meat are not effective to transitioning towards sustainability.

(C) *Paternalism and limits to freedom:* Several commentators feel paternalised. This is reflected in comments which assume that the article is an attempt of 'missionary work' by a vegan, that the author 'preaches' veganism and feels morally right. Commentators furthermore highlight that German citizens are sensitive with regard to 'forced vegetarianism'.

Related to the above, comments discuss limits to freedom (which often also includes concerns about paternalism and the critique of liberal states). On a societal level, the topic of un-free regimes appears frequently. Commentators expect a 'green dictatorship', 'eco-fascism' and ever more restrictions leading to a 'planned economy'. They suggest that the 'eco milieu' 'reinterprets' democratic principles just like in North Korea. Likewise, representatives are using their power to impose restrictions in line with what they (personally) currently feel is right and wrong to protect the rights of individuals in the name of all. One commentator will not 'succumb' to climate change. Regulators are portrayed as 'opponents' of individuals, which e.g. act arbitrarily while environmental protection and regulations targeting environmental protection are a burden. On an individual level, arguments point towards the freedom of choice, i.e. if citizens want to eat a lot of cheap meat, they are allowed do so. Citizens are humans and shall live out their free will. One person reports that when he/she has appetite for meat, then he/she wants to satisfy that appetite. He/she eats meat because he/she 'can'.

(D) *Accessibility and affordability:* In response to the article's proposal to increase prices for meat and animal-derived products, commentators argue that meat consumption is something that should be accessible to all. Higher prices would prevent this universal access to meat for all. Moreover, comments envisage a two-class society which is rooted in transitioning towards sustainability. For instance, commentators worry that as a consequence of higher prices poor people are forced to eat less meat because they cannot afford it. Furthermore, they voice concerns over the inequality between rich and poor individuals which is expected to increase – thus creating injustice. Meat consumption, alongside other sustainability 'luxuries' such as flying and cruise shipping, would only be accessible to the well-off. The middle class and not-well-off people would have to live in renunciation and carry the burden of environmental protection.

(E) *Pleasure and normality:* Meat consumption is closely related with special (social) occasions and at the same time is also 'normal'. Normality is expressed in a commentator reporting from 'many households' where daily meat consumption is self-evident as well as the 'drastic' amounts of meat in daily live (e.g. BBQ). While meat consumption is a (reported) daily habit of some, it turns into something special after shifting to a diet with less meat. For example, some commentators find that shifting to less meat allowed for new more conscious consumption habits and greater enjoyment. Besides, pleasure is a frequent emotion associated with meat. One commentator confesses that because meat tastes good it takes willpower to renounce from it. Apart from that, meat consumption has a social dimension. For instance, one commentator describes that at home, they eat vegan, when going out vegetarian and when being guests at other people's places carnivore. In addition, meat is related to 'Sundays' of the past, Christmas and Easter. Other barriers to changing diets are convenience and the (assumed) missing variety of tastes. They are reflected in one person discussing that although wishing to become an 'environmental-conscious vegan', it would be difficult to only eat laid-in apples, pears and cabbage.

(F) *Necessity of livestock and meat:* Another theme in the comments is the necessity of cows and the livestock sector in general for the environment and for humans – the article discusses the need for at least some livestock farming for biodiversity considerations. A frequent argument emphasises the importance of animals and their excrements in nutrient cycling. Besides, while banning technologies that are based on fossil fuels – as proposed in the article – would lead, among others, to famine, animals are *required* to ensure food security. One person reports from other cultures where animals are necessary for many things of daily life including food and clothing. Moreover, commentators point towards health benefits of meat consumption including digestibility and prevention of blood sugar fluctuations, and discuss the unhealthy aspects of vegetables. Furthermore, meat consumption is perceived as something that is natural for humans and cannot/should not be restricted (Beverland, 2014, p. 374). In line with that, one commentator finds that because humans are descendants of hunters, it is normal to eat meat.

(G) *Scepticism towards arguments of the article:* At last, we find a number of comments which question the arguments of the article. For example, disagreement over general foundations of the article is reflected in a statement where one person argues that humans cannot protect the climate; that is a fantasy and build on lies. Others wonder about the demands directed towards the general public based on 'unproven assumptions' alongside the argument that eating less meat to fight climate change and environmental protection is window dressing. Scepticism is also directed towards more specific topics of the article such as the health benefits of diets with less meat and animal-derived products as well as the high consumption level of these products in Germany. Though in particular commentators elaborate on the issue of pastures. The article states that approximately 80 percent of global agricultural land is used to produce animal derived food and meat (pastures and feed production). It furthermore argues that pasture grazing can be beneficial for environmental protection and is the lesser evil for climate change. While one commentator appreciates this 'reasoned perspective', another one disagrees with the benefits of pasture grazing for environmental protection. A number of commentators furthermore critically remark on or inquire about the extent to which these 80 percent could be transformed into other forms of productive land.

We now discuss the extent to which these themes reflect the motivational factors identified in Section 2.1 (knowledge, values, self-interest, structural problems, concepts of normality and emotions) and provide answers to the third research question. In addition to the themes, where applicable, we also refer to single comments outside the themes to better represent the data.

4.1. Knowledge

Knowledge typically plays a minor role as barrier towards transitioning towards sustainability (Ekardt, 2020; Stoll-Kleemann and O'Riordan, 2020). Still, some studies find that consumers are frequently not aware of the impact of (meat) diets on to the environment and climate (Austgulen et al., 2018; Macdiarmid et al., 2016). From the themes above, we only find that 'scepticism towards the arguments of the article' fits into this category (Fig. 2). While these (critical) comments potentially enable a lively discussion and informational exchange they could also (collectively) aim to undermine the credibility of the arguments of the article and find excuses for remaining in the status quo. Apart from that, there is one commentator who wrongfully states that cows do not contribute to climate change because they do not emit carbon dioxide. Still, there appear to be other knowledge gaps (Thøgersen, 2014, p. 90). For example, one commentator is looking for suitable alternatives for meat. Others point towards the fact that people increasingly do not know (or want to know) how to make use of an entire animal. Simultaneously, commentators contribute knowledge to the

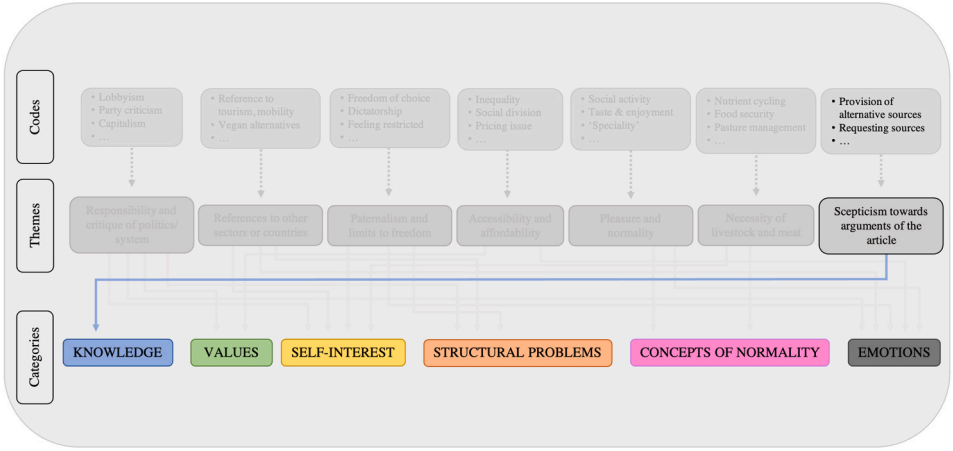

Fig. 2. Knowledge.

discussion by, e.g. referring to documentaries, citing other sources and reporting from their own experiences (Section 2.2) (see also Blom et al., 2014; Paskin, 2010).

4.2. Values

Commentators express a number of values. In particular, the theme 'accessibility and affordability' is relevant (Fig. 3). Commentators highlight their desire for fairness and equality when cautioning that transitioning towards a sustainable society will leave the poor behind. They are afraid of societal inequality. Other studies find similar views with regard to the cost of sustainable products and lifestyles (Axon, 2017, p. 18; Barosh et al., 2014; He et al., 2021; James et al., 2018, p. 471). Interestingly, rather than speaking of themselves, these comments refer to 'the poor', i.e. other people. As such, they point towards structural issues in moving towards sustainability (Thøgersen, 2014, p. 90) and aim to economically and morally justify low prices for meat (and animal-derived) products (Stoll-Kleemann and O'Riordan, 2020, pp. 8–9). In sum, these values appear to hinder a transition. Yet, values could also help transitioning towards sustainability by inducing behavioural change. The theme 'responsibility and critique of politics/system' illustrates this observation. For example, commentators frequently pledge for more animal welfare and voice critique over industrial (animal) farming. Animals should be treated better. Apart from that, those who have reduced their meat and animal-derived products intake state that they inflict less harm on to the environment and animals. As such, values appear to have the potential to induce societal change, but they might also inhibit change.

4.3. Self-interest

An important motivational factor is self-interest. Where commentators show an unwillingness to change their behaviour in light of pressing environmental issues, they act selfish (see also Lea et al., 2006, pp. 831–832; Macdiarmid et al., 2016, pp. 490–491). The theme 'responsibility and critique of politics/system' is relevant (Fig. 4). Commentators accuse single politicians, political parties, lobby groups, supermarkets, and themselves for being selfish. There is substantial criticism towards politics and the market system as well as over the interwovenness of policy makers and interest groups. Besides, while some of the (policy) proposals made by the commentators require individuals to reduce meat consumption, the majority does not demand commentators to change their behaviour personally and directly. Taken together, these arguments deny the necessity for individual action and commentators shift blame and responsibility away from themselves which supports the findings of other studies (Bandura, 1991, pp. 79–80; Stoll-Kleemann and O'Riordan, 2020). This also highlights the vicious circle of the multitude of actors involved in transitioning to sustainability (Section 2.1). Related to that is the theme 'paternalism and limits to freedom'. Individuals fight against anything that restricts their life and choices; meat consumption is perceived as an act of freedom and individual decisions are superior to climate change and global biodiversity loss. Self-interest calculations could also be reflected in blaming other sectors for their environmental impact (theme 'references to other

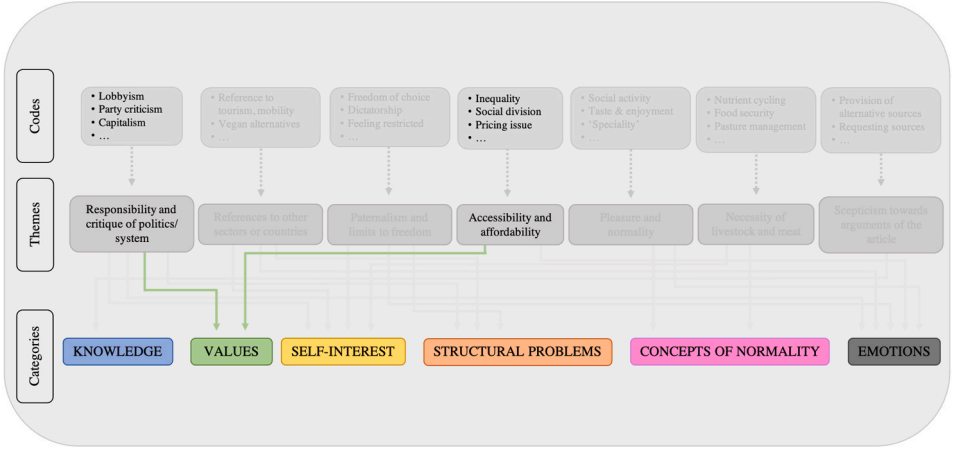

Fig. 3. Values.

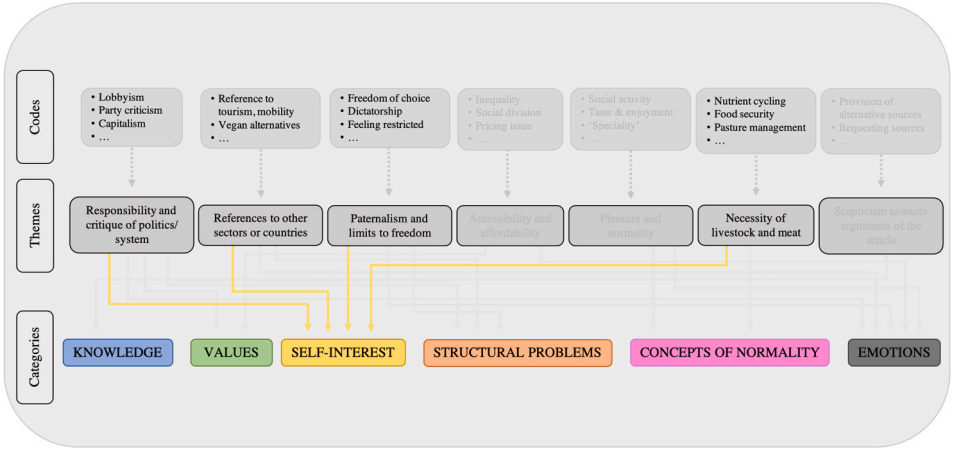

Fig. 4. Self-interest.

sectors or countries') and justifying the necessity for livestock production and meat consumption with e.g. 'evolutionary explanations' (theme 'necessity of livestock and meat') while in fact, meat consumption in developed countries is a choice (Stubbs et al., 2018, p. 127). These arguments aim to keep the status quo and thus hinder a transition towards sustainability.

4.4. Structural problems

We find structural problems with regard to collective goods and action as well as path dependency. According to economic theory, public goods are goods from which no one can be excluded and whose consumption is non-rival. These goods suffer from free riding problems, i.e. individuals receive the benefits of the good without paying for it (Berck and Helfand, 2011, pp. 50–51). The global climate and environment are public goods. Were commentators state that they will not change their environmentally harmful behaviour, i.e. not limit their freedom and instead keep unsustainable diets, and thereby continue to support the exploitation of the natural environment without paying for it, they manifest the issue of free riding (theme 'paternalism and limits to freedom') (Fig. 5). On the flipside, issues of collective action are present where individuals find that their action is useless or does not make a difference (Bandura, 1991, p. 76; Macdiarmid et al., 2016, p. 490; Stoll-Kleemann and O'Riordan, 2020, pp. 9–10). The theme 'references to other sectors or countries' illustrates this issue. Commentators argue that individual diet choices do not make a difference to global climate. Moreover, path dependencies become apparent. Systems are path depended when they are locked into a certain direction by, e.g. positive feedbacks. Changing direction is challenging. The theme 'responsibility and critique of politics/system' is relevant. Commentators blame policy makers for being path dependent and in fact, these institutional factors have been found to hinder changing consumer diets (Beverland, 2014, pp. 376–377). Besides, the concept of path dependency has been used to comprehend (lacking) *effective* policy developments in the agricultural sector in the EU (Kay, 2003). In the present case, individual path dependency appears where commentators hold on to traditions and social conventions and feel stuck in a system that does not allow them to change. At the same time, (vegan) alternatives are perceived environmentally harmful.

4.5. Concepts of normality

For some commentators, eating meat is not just a question of self-interest, but normal – like everybody is simply doing that – and thus hinders behavioural change. Eating meat is rooted in or associated with traditions and religion (Easter and Christmas). The necessity for meat consumption functions as justification (theme 'necessity of livestock and meat') (Fig. 6). Besides, the theme 'pleasure and normality' are relevant. Eating (meat) is a social activity and thus influenced by other people and social conventions. Being 'locked in' in daily life stands in the way to change the 'normality' of eating meat. As such, according to the theory of planned behaviour, commentators appear to believe that eating meat is a subjective norm which negatively affects the intention to change their behaviour towards sustainability (Ajzen, 1991). Outside the

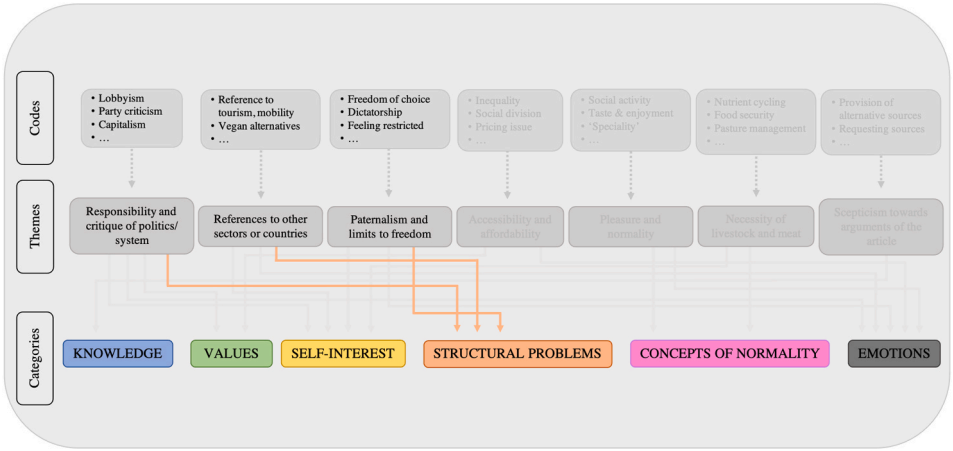

Fig. 5. Structural problems.

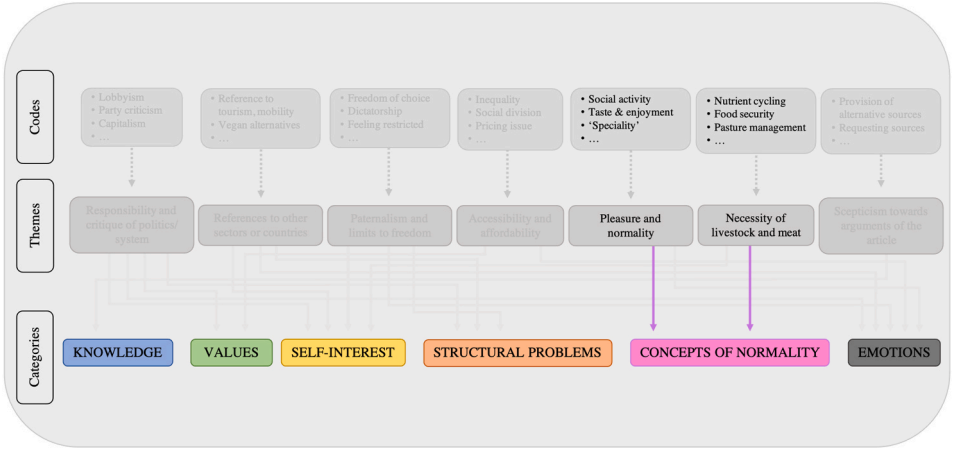

Fig. 6. Concepts of normality.

themes, commentators acknowledge that the consumption of meat has changed. For example, commentators argue that people can or do not consume entire animals as they used to. Besides, having Sunday roasts is seen as a desirable consumption habit of the past. Commentators furthermore argue that if people were to slaughter by themselves, meat consumption would drastically decrease. They point towards the increasing estrangement of meat production from society (Vinnari, 2008).

4.6. Emotions

At last, the analysis sheds light onto a large bouquet of emotions which hinders transitioning towards sustainability. A number of these emotions are embedded in the theme 'responsibility and critique of politics/system' (Fig. 7). Commentators show distrust towards policy makers and displace responsibility from themselves to a different level (Bandura, 1991, pp. 79–80; Graça et al., 2014, p. 758; Happer and Wellesley, 2019, pp. 133–134; Stoll-Kleemann and O'Riordan, 2020). Commentators express frustration, anger, lacking trust, and scapegoating towards authorities, scientists, policy makers, and the political system. Frequently, there is the feeling of being left behind. In addition, the feeling of limited agency is prominent. Commentators are feeling powerless and locked into a system that does not allow them to change (Happer and Wellesley, 2019, p. 134). This leaves commentators with a highly limited perceived behavioural control which, according to the theory of planned behaviour, makes a certain behaviour (here: eating less meat) unlikely (Ajzen, 1991). Besides that, aspects of the theme 'paternalism and limits to freedom' are relevant. People feel over-regulated, which confirms the findings of another study (Austgulen et al., 2018, p. 9). In addition, there appears to be fear over large and forced interventions in individual lives and comments overall paint dystopian pictures (see also: Graça et al., 2014, pp. 756–757). Moreover, the theme 'references to other sectors or countries' reflects emotions. These arguments shift responsibility away from the livestock and dairy sector and attribute it to other areas. It follows that (individual) meat consumption does not need to be reduced. Other studies also identify this line of argument (Macdiarmid et al., 2016, p. 490). In addition, the theme 'accessibility and affordability' is relevant. Commentators are jealous of individuals who are expected to be able to afford certain 'sustainability luxuries'.

Positive emotions are expressed by those commentators who have shifted towards a vegetarian or vegan diet. The theme 'pleasure and normality' is relevant. For example, these commentators feel fitter and healthier, and report even more taste variety and enjoyment. In stating that, they might strive for recognition (Section 2.1). Some express curiosity about new ways of cooking, new shops and observing others who pursue a vegetarian/vegan diet. At the same time, daily/frequent meat consumption is (also) associated with pleasure, good taste, family and fun times which thus hinders transitioning to a sustainable diet (Macdiarmid et al., 2016, p. 491; Stubbs et al., 2018, pp. 130–131). In fact, enjoyment and pleasure are an important component of both, frequent and non-frequent beef-consumers in their decision-making processes (Barrena and Sánchez, 2009). Besides, meat consumption not only appears to be a social activity but is also rooted in cultural norms – both of

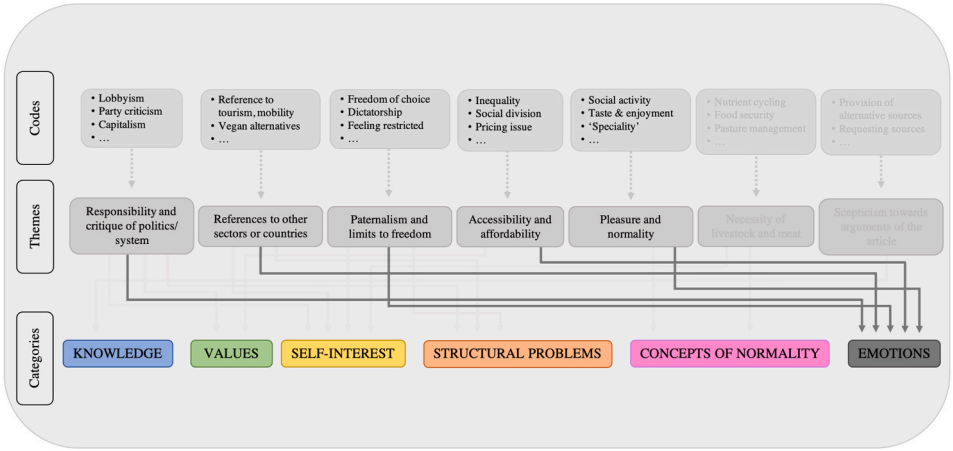

Fig. 7. Emotions.

which are challenging to reform (Barrena and Sánchez, 2009; Beverland, 2014, pp. 375–376; Stubbs et al., 2018, pp. 130–131). At last, denial is a prominent feature. For example, the significant contribution of the agricultural sector to climate change and biodiversity loss is denied as well as the necessity of individual action (Stoll-Kleemann and O'Riordan, 2020; Thøgersen, 2014, p. 89). In sum, eating meat (and animal-derived products) is more than just the intake of calories which makes transitioning towards sustainability highly challenging. Yet, those who have moved to a vegetarian or vegan diet express a high level of satisfaction.

5. Conclusions

The present article contributes to understanding (changing) human behaviour and the motivational factors that affect transitioning towards sustainability. We aimed to identify the causes of non-sustainable behaviour (meat and animal-derived products consumption), i.e. to identify the factors that stand in the way to achieve individual and societal change. The theoretical framework suggests that different motivational factors (i.e. knowledge, values, self-interest, structural problems, concepts of normality and emotions) impact (lacking) societal change. We assessed if these motivational factors were reflected in the data. To this end, we analysed online comments written in response to a news article. While we identified several commentators who support shifting towards sustainable diets with less or without meat and animal-derived products, we also identified multiple barriers. Notably, a reduction of meat consumption – rather than the reduction of meat *and* animal-derived products – dominates the comments. Vegetarian diets seem to be on the mind of many commentators, vegan diets appear less prominent. The analysis furthermore provides indications to the importance of the different motivational factors which hinder transitioning diets towards sustainability (Fig. 8). While (a lack of) knowledge does not appear to be a dominant obstacle, a prominent barrier is emotions. Five of the seven themes feed into emotions giving this motivational factor a prominent role. Of similar importance appears self-interest which four themes touch upon. These results confirm the theoretical framework of the motivational factors. Values seem to enable *and* hinder behavioural change. When taking the opposite perspective, the analysis highlights that the theme 'responsibility and critique of politics/system' touches upon four motivational factors which hinders transitioning towards sustainable diets followed by 'references to other sectors or countries' and 'paternalism and limits to freedom'. This shows the complexity as much as the interwovenness of the motivational factors in changing behaviour. These factors in combination with the interdependence of all actors of society (e.g. farmers, consumers, politicians, voters) might explain why achieving global environmental goals is so very challenging.

At last, we would like to highlight five limitations of our study. (1) Even though some scholars argue that reader comments can shed light on to the 'public's consciousness' (Santana, 2015, p. 92), we agree that commentators do not necessarily reflect the views/opinions/attitudes of the general population or the readership of the newspaper (Koltsova and Nagornyy, 2019; Woods et al., 2018, p. 254). In fact, studies have shown that commentators of web news articles have certain personality traits (Wu and Atkin, 2017) and that for example, men are more likely to participate in comment spaces than women (Friemel and Dötsch, 2015; Meyer and Carey, 2015; Van Duyn et al., 2019; no gender effect found here: Bergström, 2008) although this is difficult to find out. Moreover, some scholars caution that, in order to be able to make robust conclusions about e.g. the motives and motivations of the authors of written text, more comprehensive investigations into the authors are needed (Brosius et al., 2012, p. 137). However, the interpretation of motives is equally difficult in more formal approaches such as experiments. Surveys can also lead to inaccurate insights on motives since people might not answer correctly or may not be aware of some of their motives (Ekardt, 2020). (2) There are challenges associated with, e.g. identifying (hidden) emotions or beliefs in comments. In a face-to-face interview, researchers are able to recognise gestures and mimics, both of which cannot be – or to a limited extend – be expressed in a written format (Marotzki et al., 2014, p. 451; Seymour, 2012, pp. 345–346). Besides, a researcher when reading and analysing a written text can come up with a different meaning than intended by the author (Bryman, 2004, p. 391). While we cannot exclude to have missed or misunderstood some of the content, the in-depth analysis and discussions in our team are likely to have kept this issue to a minimum. (3) There is an ongoing debate about the challenges associated with coding. In extracting text elements from its context, the meaning of the text might get lost. Furthermore, data might become fragmented (Bryman, 2004, p. 411). We addressed this issue by marking the selected content with e.g. a description of contextual information (suggested by: Grønmo, 2020, p. 212) and frequently went back to the original data. Besides, in order to ensure reliability of the results, coding must be done consistently which includes, e.g. consistent coding between the researchers involved in the project (inter-coder reliability) (Gomm, 2008, p. 299; Santana, 2015, pp. 98–99). In this study, analysis was performed by one person only making inter-coder reliability not applicable. Instead, we ensured consistency through a very thorough and detailed analysis with time spans in between to not lose the overall picture of the material. (4) Using online data bears some additional challenges. Websites and virtual data are changing frequently so an analysis might be based on data that has changed in the meantime (Marotzki et al., 2014, pp. 450, 453–454; Wimmer and Dominick, 2014, p. 184). Regarding our study, comments

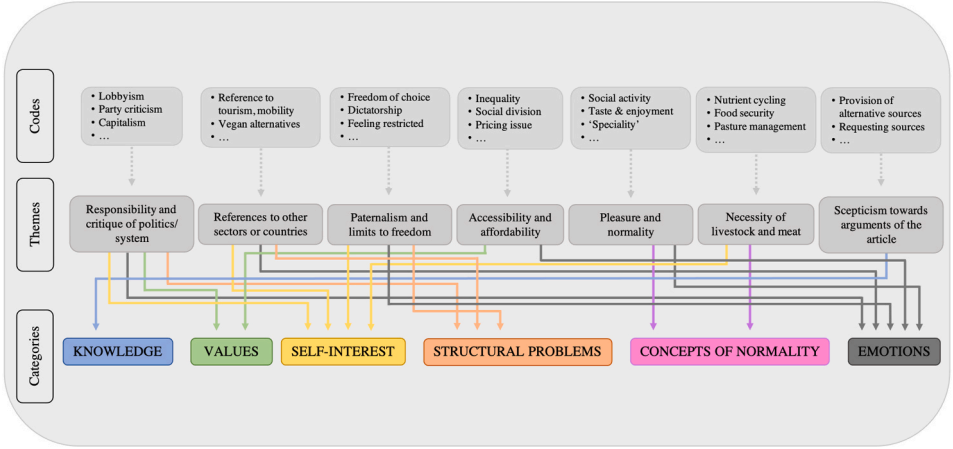

Fig. 8. Overview of the findings.

might have been added to the article after the analysis has taken place. Yet, as the most recent comment was posted in April 2019, we believe the data basis will not change significantly. Another issue is that directly quoting from a website can easily be traced back to the writer of the comment; where commentators have used their 'real name' on the website, there would be a lack of data protection (Marotzki et al., 2014, p. 461). We addressed this issue by reducing direct quotes to a minimum. Moreover, reader profiles are accessible for the public anyway. (5) At last, some argue that there might be an ethical issue in that participants do not have an opportunity to express their 'informed consent' (Grønmo, 2020, p. 189; Kozinets et al., 2014, pp. 286–269). Others find that informed consent is not required when analysing news reader comments that are in the public domain (Braun and Clarke, 2006, p. 248). All in all, ethical considerations are always a bit risky since ethics is a much vaguer field than e.g. the law – and from a legal point of view, analysing web news comments does not face any restrictions. Furthermore, an is-ought fallacy has to be avoided: The ethical evaluation of a methodology does not say anything about its empirical validity (Ekardt, 2020). Future research could address some of these issues by combining an analysis of user-generated comments with face-to-face qualitative methods such as focus groups. Yet, such a combination would eliminate the unobtrusive nature of the approach adopted in the present study. Balancing these considerations will thus play a vital role when developing further studies.

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CRediT authorship contribution statement

Katharine Heyl: Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing. **Felix Ekardt:** Conceptualization, Writing – original draft, Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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