A dynamic perspective on publics and counterpublics: The role of the blogosphere in pushing the issue of climate change during the 2016 US presidential campaign

Hannah Schmid-Petri

University of Passau, Germany, Hannah.Schmid-Petri@uni-passau.de

Ueli Reber

University of Bern, Switzerland, Ueli.Reber@ikmb.unibe.ch

Dorothee Arlt

University of Bern, Switzerland, Dorothee.Arlt@ikmb.unibe.ch

Dag Elgesem

University of Bergen, Norway, Dag.Elgesem@uib.no

Silke Adam

University of Bern, Switzerland, Silke.Adam@ikmb.unibe.ch

Thomas Häussler

University of Bern, Switzerland, Thomas.Haeussler@ikmb.unibe.ch

Abstract

Climate change was hardly debated during the 2016 US presidential campaign. Against this background and building upon Frasers' concept of counterpublics (1990), this paper examines whether climate change advocates used the English-speaking Blogosphere to push their positions forward. This study uses blog data starting from the Republican nomination of Donald Trump (July 20th, 2016) to Election Day (November 8th, 2016) and applies a computerized classification algorithm and topic-modeling techniques to explore, first, the salience of skeptic and advocate positions toward climate change in the English-speaking blogosphere and, second, with which topics these positions are most connected. The results show that the positions and topics of climate change advocates were more salient online than those of climate-change skeptics during the 2016 US presidential campaign. Thus, the study shows that the relation between different publics in societal discourses is not static but may change dynamically over time.

Keywords: climate change, blogs, US election 2016, counterpublic sphere, automated classification, topic modeling

Word count: 7011 words

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Climate change and its consequences is one of the biggest challenges mankind is currently facing. At the same time, it has become one of the biggest political controversies in the US that increasingly divides both the US Congress and the American population (Borenstein, 2016; Dunlap, McCright, & Yarosh, 2016). On one side stand climate skeptics who doubt the occurrence of global warming, our anthropogenic contributions and its negative impacts, and/or refuse binding agreements. On the other side stand climate advocates who follow the scientific consensus and try to tackle and mitigate climate change.

Against this background it is remarkable that climate change played a next to negligible role during the 2016 US presidential campaign, ranking far behind other top issues such as the economy, terrorism, and health care (Faris et al., 2017, p. 88; Pew Research Center, 2016). Across all three television debates both candidates, Hillary Clinton and Donald Trump, spent just about two minutes discussing environmental and energy issues (Sidahmed, Puglise & Diehm, 2016). Thus, neither Democrats nor Republicans attempted to make the issue of climate change particularly salient; rather, they avoided putting it on the agenda during the campaign period.

The absence of climate change from the campaign played right into the hands of the Republicans. In the US, the conservative movement is strongly tied to skeptical viewpoints (Brulle, 2014; Cann & Raymond, 2018; Elsasser & Dunlap, 2013), and for its members, the nomination of Trump promised the possibility for a political change, such as the withdrawal of the US from the Paris climate agreement.

In contrast, most Democrats see climate change and its impacts as highly problematic and 69% of the registered Clinton supporters stated that environmental issues are important

for their vote (Pew Research Center, 2016). Consequently, Democrats could have been thought to be strongly interested in discussing environmental and climate issues to mobilize their supporters and attract potential voters. However, since the Clinton camp did little to make climate change more prominent on the public agenda, the presidential campaign appears, at least in this respect, to have been influenced by the silencing strategies of the conservative side and climate skeptics (Adam et al., 2016). That climate change was not debated in the course of the presidential debate might have been perceived as an emerging shift in the public discussion about climate change by climate advocates in a sense that their positions were in danger to be excluded.

In the light of this development and drawing on (counter)public theory (Fraser, 1990) it is an open question whether climate change advocates, as a reaction to this "silencing," increasingly and more vigorously engaged online to push the issue and their positions. Scholars have already explored the potential of various online communicative spaces to serve as counterpublic spheres (Fraser, 1990), including, for instance, alternative online media websites, social networks, discussion forums, user-comments sections, and blogs (e.g., Dahlberg, 2011, Downey & Fenton, 2003; Eckert & Chadha, 2013; Riegert & Ramsay, 2013; Toepfl & Piwoni, 2015). Particularly in the case of climate change, blogs have proven to be central actors in the online debate about the issue and previous research has shown that in most cases in the past it was particularly climate skeptics who voiced dissenting views and positions from the mainstream of the debate in blogs or on their websites (Boussalis & Coan, 2016; Elgesem, Steskal & Diakopoulos, 2015; Schäfer, 2012; Sharman, 2014). However, within the 2016 US presidential campaign, we observe a changing configuration of power between climate skeptics and climate advocates and the struggle between these competing publics. This change opens up a window of opportunity for climate skeptics to transmit their ideas, and at the same time, implies a threat to climate advocates, which possibly mobilizes

them. In this vein, the climate advocates probably perceived themselves to be in the role of a counterpublic that needed to mobilize against the neglect of the issue as such, and the emerging threat that a pronounced climate skeptic could become president of the United States of America. Thus, it is plausible to assume that they actively used the possibilities of online communication to promote their environmental concerns. Against this background, the main research question of our study is: *Did climate change advocates use the English-speaking blogosphere to push their positions forward in the 2016 US presidential campaign?*

To answer our research question, we study (1) the salience of the positions voiced in the English-speaking blogosphere and their dynamic development in the course of the campaign period, and (2) the topics that are connected to these positions and thus gain prominence.

Our study contributes to previous research in mainly two ways. First, up to now, we only know little about the dynamic interplay of different publics as well as emerging counterpublics. Due to changing contexts, the relative strengths of different publics in public discourse may change. The climate change issue during the US presidential campaign allows us to study such possible dynamics. Second, our study provides insights into the role of the blogosphere as an arena for political debate in the context of election campaigns, which has thus far been rarely done. When the issue is addressed in previous research, its main focus is on the candidates' blogs, rather than a civil society perspective. As a consequence, we do not know how strongly the blogosphere is affected by and reacts to external events such as election campaigns.

To answer our research questions, we analyzed roughly 1,600 English-speaking blogs and their posts dealing with climate change and the election campaign between July 20 (nomination of Trump) and November 8, 2016 (Election Day). To identify the positions concerning climate change, we used an automated classification algorithm, and to analyze the topics, we applied a latent Dirichlet allocation (LDA) topic modeling.

The dynamic interplay of competing publics in climate change communication

"The current political public sphere is generally conceived as a 'space' produced by communication about public matters as in journalism, opinion and argumentation, in face-to-face communication as well as in mediated communication" (Rasmussen, 2014, pp. 1,315–1,316). Within this space, a plurality exists of competing publics, and depending on the wider (political) context, certain issues and positions are more dominant than others at a certain point in time.

Around those issues and positions, which are neglected in the dominant public debate, the emergence of counterpublics that try to change the public agenda or society at large becomes more likely. In the literature, the term "counterpublic" is used for a variety of social groups, such as the social movement in the US or the Green movement in Germany, which aim to change the respective society for the better (Dahlberg, 2011; Fraser, 1990), but also for radical groups (i.e., the right-wing movement), which oppose democratic values and try to influence public discourses and politics (Downey & Fenton, 2003). More generally speaking, counterpublics "emerge in response to exclusions within dominant publics, they help expand discursive space" (Fraser, 1990, p. 67; see also Downey & Fenton, 2003; Nuernbergk, 2013). This means that a counterpublic sphere emphasizes certain issues and/or positions which are neglected in the dominant mainstream debate and "is typically located … in communicative spaces outside the mass media" (Toepfl & Piwoni, 2015, p. 466).

According to Fraser (1990), counterpublics fulfill two basic functions. First, they provide a space for the countermovement to develop a social identity, and second, they aim to impact society, especially the dominant public. This "contestation among competing publics supposes inter-public discursive interaction" (Fraser, 1990, p. 68). Due to that interaction, the discursive dominance of certain publics varies and changes over time. The literature on the

concept of political opportunity structures identifies several factors that can disrupt the discursive stability of certain publics and the allocation of discursive dominance in a societal discussion (e.g., Meyer, 1993; Meyer & Staggenborg, 1996). Among other factors, the varying salience of issues and their positions are influenced by key participants' strategic agenda-setting activities as well as the changing positions of political elites, parties, and/or interest groups, coalitions, and boundaries of legitimacy in a discourse (Baumgartner & Jones, 1993; Gamson, 1988; Meyer, 1993).

In cases when the issues and positions discussed on a certain agenda change, the tenor of the counterpublic sphere should also shift as the development of a movement, and its tactics "are profoundly affected by shifting constellation of factors exogenous to the movement itself" (Meyer & Staggenborg, 1996, p. 1,633). Thus, the formation of protest and counterpublics is closely related to the activities and contents of the main political or mass-mediated arena (see also Meyer & Minkoff, 2004; Toepfl & Piwoni, 2017).

With regard to climate change, the dominant discourse is represented first by the majority of climate scientists worldwide who have reached a commonly accepted consensus regarding the occurrence of an anthropogenic climate change, its causes, and consequences (e.g., Anderegg, Prall, Harold, & Schneider, 2010; Oreskes, 2004). Second, the issue is very present in US mass media (e.g. Boykoff et al., 2019) and growing empirical evidence suggests that advocating an anthropogenic climate change is the most dominant way of covering climate change even in US mass media (e.g.; Boykoff, 2007; Brüggemann & Engesser, 2017; Painter & Ashe, 2012; Schmid-Petri, Adam, Schmucki, & Häussler, 2017). Thus, the position of the climate advocates generally seems to be the dominant position in public discourse, whereas climate skepticism was not absolutely absent, but rather rare in the mainstream public discourse reflected in the mass media.

However, in the context of the recent US presidential campaign, skeptical standpoints gained more prominence within the political establishment and a higher social acceptance compared to former times, as most of the top Republican candidates held skeptical viewpoints. This culminated in the nomination (and election) of Donald Trump, who openly expressed his denialist position concerning climate change several times (e.g., in his tweets). This development might be perceived as a threat and might have provoked the fear of being marginalized among climate change advocates.

The role of the blogosphere as a counterpublic sphere in climate change communication

The internet with its unlimited capacity opens up additional space for public discourse and "extends and pluralizes the public sphere in a number of ways" (Dahlgren, 2005, p. 148; Papacharissi, 2002). This means that issues and positions, which are neglected in other arenas or oppose mainstream views, find a space (Dahlberg, 2011; Downey & Fenton, 2003; Nuernbergk, 2013). A central attribute of online communication is its transnational character, and US presidential campaigns are especially closely followed by foreign audiences (Sevin & Uzunoğlu, 2017).

As mentioned earlier, several studies have examined the potential of the internet to establish counterpublics in various different communication spaces, such as alternative online media websites, blogs, social networks, discussion forums, and user-comments sections (e.g., Cammaerts, 2009, 2012; Dahlberg, 2011, Downey & Fenton, 2003; Toepfl & Piwoni, 2015).

Especially blogs provide an important realm for counterpublics as they are often seen as representing the "true voice of the people" (Park, 2009, p. 267) and "breaking with those who claim a privileged place in the social order" (Park, 2009, p. 268). At the same time, they have been shown to be important actors in public discourses with the potential to influence society and (international) media coverage, and play an important role in contesting traditional media coverage (Bar-Ilan, 2005; Bruns, 2007; Faris et al., 2017; Farrell & Drezner, 2008; Wallsten,

2007). Climate change belongs to those issues that are discussed vividly online, and blogs are an important platform for the politicization of climate science (Elgesem et al., 2015; Sharman, 2014). Previous work has shown that particularly climate skeptics are present and active in the blogosphere (Elgesem, 2017; Schäfer, 2012, p. 529). Concerning the discussed topics, Elgesem and colleagues (2015) examined distinct communities and their communication patterns in the English-language blogosphere, and found that the biggest community was predominantly skeptical. However, various communities of bloggers who accepted climate change also existed. Moreover, based on the distribution of topics, they found that the communities had different topical profiles. For the skeptical community, the most relevant topic was "US politics" followed by "climate change science" and "economic politics." In contrast, for the majority of advocate communities, "climate change politics" and "climate change science" were the most relevant topics. Yet, the topics "US politics" and "energy" were also important.

A study on blogging about the Paris meeting revealed two groups of bloggers: those who were strongly involved with the negotiations and mainly accepted the reasoning of the negotiations, and those who were skeptical about climate change and consequently viewed the political negotiations as useless (Elgesem, 2017). Additionally, Elgesem (2017, p. 195) showed that skeptical blogs were actively linked to mainstream sources that "took a clear stance in support of the effort to reach an international agreement to mitigate climate change" with an attempt to target these views in their blog posts and to engage "in the production of counter-arguments to the claims made by the consensus side" (see also Häussler et al., 2017). Likewise, Kaiser (2017) found that in Germany climate skeptics blogs functioned as a counterpublic to counter the climate advocating mainstream narrative.

Considering previous research on the English-language blogosphere on climate change, it became evident that in most cases in the past it was particularly climate skeptics who voiced

their dissenting views in blogs and those who were especially active online. Thus, the English-speaking blogs "are acting themselves as alternative public sites of expertise for a climate skeptical audience" (Sharman, 2014, p. 167).

However, within the 2016 US presidential campaign, skeptical standpoints gained prominent supporters and the position of the climate advocates was challenged (see above). Thus, our general research question arises as to whether the blogosphere provided an alternative space for climate advocates to push the issue and their positions concerning climate change. Therefore, to answer our general research question, we ask concretely (1) which position regarding climate change (skeptics vs. advocates) was more salient in the English-speaking blogosphere during the 2016 US presidential election campaign; and to gain deeper insights into the climate change discourse, we further analyze (2) which topics (i.e., aspects or perspectives concerning climate change) were emphasized or "owned" by each position.

Methods and Measurement

Data collection and sample

To answer our research questions, we analyzed English-speaking blogs and their posts. To collect the blog data, we used the paid access provided by the company Twingly (twingly.com) that indexes blogs for different languages (see also Elgesem, 2017). The blog posts were gathered through their API using the search term "climate change." We collected posts from July 20, 2016, the date of the official nomination of Trump, to November 8, 2016, Election Day. Our intention was to collect the blogging that took place after the nomination, which in our case can be understood as a "wake-up call" for the climate advocates in the blogosphere, until the "final shock" when Trump was finally elected. Initially, we collected 222,061 blog posts in the mentioned time period. However, for Twingly, it is enough that "climate" and "change" occur in the same document and not necessarily together as a bi-gram. Thus, to identify the posts that dealt substantially with climate change and also linked the issue to the election campaign, we only included those posts in our analysis which contained specific climate change as well as campaign keywords[1] (12,667 posts). Finally, we included only posts from blogs that published more than two posts on climate change and the presidential campaigns during the period covered by this study. Thus, our final sample contained 8,786 posts from 1,599 blogs. Among the blogs with the most posts in the sample are blogs of advocacy news organizations (e.g., dailykos.com, slate.com, motherjones.com, grist.org, counterpunch.org) as well as non-governmental advocacy organizations (e.g., mediamatters.org, blog.heartland.org), but also blogs of (groups of) individuals (e.g., uscfhq.blogspot.com, antigreen.blogspot.com, oldephartte.blogspot.com). The blogs in the sample thus have a different degree of professionalization (professional editors vs. dedicated

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[1] Posts that mentioned "climate change" or "global warming" at least twice and at least one campaign keyword (hillary, clinton, democratic campaign, democratic nominee, donald, trump, republican campaign, republican nominee, jill stein, gary johnson, presidential campaign, us election, u.s. election, us voting, u.s. voting).

amateurs). Also, not all are based in the United States. Their potential impact on the public discourse in the United States might therefore vary. However, they have all repeatedly expressed their views on climate change in the context of the presidential campaigns in English and are thus included in the analysis.

Identification of positions concerning climate change

To identify the positions concerning climate change in the English-speaking blogosphere, we used a classification algorithm that classified each sentence as either skeptical, advocate, or irrelevant/neutral. As a classification algorithm, we utilized a Linear Support Vector Machine (SVM; Joachims, 1998), which is a well established tool for classifying large text collections. The classification was done in R using the LiblineaR package (Helleputte, 2017), which is based on the C/C++ LIBLINEAR library for large linear classifications (Fan et al., 2008). To prepare the data, we extracted the sentences out of the blog posts ($n = 789,580$ sentences) and applied several common preprocessing steps (i.e., reduction to lowercase, stemming, unigrams and bigrams, removal of bigrams with stopwords, a simple negation heuristic).

Initially, the classification model was trained for another project analyzing climate change communications offline and online. There, an active learning scenario was used to train the model (Settles, 2010). This means that an initial model was trained on a manually classified training data set (i.e., manually classified sentences for the advocate and skeptical category, randomly selected sentences unrelated to climate change for the irrelevant/neutral category). Then unlabeled sentences were classified by the model and the results were evaluated by human coders. The evaluated sentences were then added to the initial training data set and the model was trained once again with the hyperparameter C optimized by cross validation to avoid overfitting. This process was repeated three times until the training set did not improve the classifier's performance significantly (measured by k-fold cross validation).

In each iteration, 10,000 unlabeled sentences were randomly selected from the corpus and classified by the current model. For each of the three categories, approximately 10% of the classified sentences were evaluated by a team of three researchers. When the hand-coded sentences were treated as gold standard and compared against the machine coding, the accuracy (measured by precision and recall) of the classification algorithm after the third iteration was F1 = .68 for the advocate category, F1 = 0.65 for the skeptical category, and F1 = 0.91 for the irrelevant/neutral category (macro-average). The overall accuracy of the model was *F1* = .83 (micro-average). These are satisfying accuracy values.To measure how salient the different positions regarding climate change (advocates vs. skeptics) were in the English-speaking blogosphere during the US presidential campaign, we looked at the absolute number of sentences containing an advocate (*n* = 68,438) or a skeptical argument (*n* = 22,579), respectively.[2]

Identification of topics discussed in the blogosphere

To analyze which topics were prevalent in the blog posts (and which positions were linked to which topics), we applied latent Dirichlet allocation (LDA) topic modeling using the R-package Mallet (Mimno, 2013). Our corpus was the 8,786 identified blog posts (see above). LDA is a generative probabilistic model that can be used to describe latent thematic structures in a collection of documents (Blei, 2012). Documents are seen as mixtures of latent topics, where each topic is characterized by a distribution over words (Blei et al., 2003, p. 996; see also Maier et al., 2018). Topics are thus abstract patterns of words that frequently occur together. The concrete number of topics has to be specified by the researcher in advance and there are only a few theoretical criteria regarding the appropriate number. Thus, we used a mixture of a data-driven approach and a qualitative assessment of the interpretability of

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[2] *n* = 698,563 sentences were irrelevant/neutral.

different solutions with various numbers of topics. We validated the topics in a multi-stage process (e.g., by carefully reading the blog posts and checking whether the identified top topic appropriately described the post). Based on these criteria, we decided to use a model with 25 topics, which provided us with enough details to describe the discussion about climate change, while remaining a manageable number of different topics. Out of these 25 topics, we removed nine uninterpretable "boilerplate" topics (see table 1, Appendix) and re-calculated the topic probabilities for the remaining 16 topics. Afterwards, we identified the top topic for each post (i.e., the topic with the highest probability).

To be able to combine the position of a post with its top topic we first removed all posts which had no sentences containing a position (n=84, remaining N=8702). Second, we aggregated for each post its sentences using the following formula: (alarmist sentences - skeptical sentences)/(alarmist sentences + skeptical sentences). This results in a standardized measurement of the position for each blog posts with the value 1 meaning that a post contains exclusively advocate sentences and the value -1 meaning that a post contains exclusively skeptical sentences. Finally, we aggregated all posts with the same top topic using the mean function for the position. Thus, we can compare the mean position for each topic.

Results

To examine whether climate change advocates used the English-speaking blogosphere to push their positions forward during the 2016 US presidential campaign, we first analyzed whether skeptic or advocate positions toward the issue of climate change were more salient. To assess the salience of each position, we used the classified sentences of blog posts as either skeptical or advocating and compared the number of sentences published on each day during the study period (see Figure 1). The findings show, first, that more sentences advocating climate change were published than skeptical sentences overall in the English-speaking

blogosphere during the 2016 US presidential campaign. In total, 68,438 advocating sentences were posted compared to 22,579 skeptical sentences over the entire time period—a ratio of approximately 3:1. The findings also show that the salience of advocating sentences increased over time, starting from the Republican nomination of Trump and continuing until Election Day. The salience of skeptical sentences also increased over that time but to a lesser degree - which is also backed up by the delta-line. So with regard to the first research question, the results clearly show that the position of climate-change advocates was far more salient than that of climate change skeptics in campaign-related communication in the English-speaking blogosphere. Regarding our first research question we can thus state, that the blogosphere served as a counterpublic sphere for climate change advocates, who used the web to make their positions more salient in the campaign.

Figure 1: Activity in the English-speaking blogosphere per day
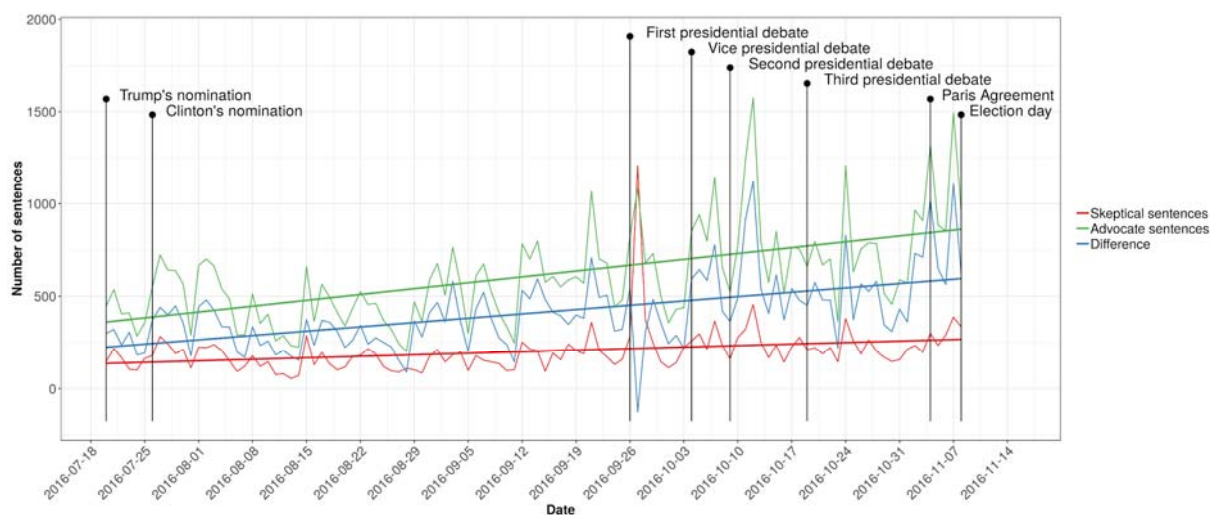
We also analyzed the topics emphasized in the context of skeptical or advocating arguments as a second indicator to assess whether climate advocates used blogs to push their topics forward (RQ2). Regarding the topics discussed during the 2016 US presidential campaign, our analysis reveals that "energy production" was the most frequently debated

topic across all blog posts (see Table 2, Appendix). Beneath that were the topics "Democratic campaign," "presidential debate," and "politicization of climate change."

To analyze which position is related to which topic, Figure 2 displays the mean position of posts discussing the same top topics on the x-axis and the frequency of each topic as top topic on the y-axis. Theoretically, the mean position of posts contains three possible ranges of values: -1 to < 0, indicating that the mean position of a post is skeptical; 0, indicating that the mean position of a post is balanced between skeptical and advocating sentences; and > 0 to +1, indicating that the mean position of a post is advocating. However, Figure 2 reveals that all topics were related to an advocating position, and no topic appears primarily in posts with a skeptical stance (< 0). Nevertheless, there are some clear differences, as some topics are more strongly related to advocating sentences in the posts than others. These are amongst others the topics that directly discuss aspects of climate change, e.g "consequences of climate change" (25), "celebrities and climate change" (10), and the most frequently discussed top topic "energy production" (14). These topics are clearly owned by the climate advocates.

However, there are also topics for example "politicization of climate change" (11) where the posts have a lower positive-mean position, meaning the advocating position is less dominant over the skeptical position in the posts where the politicization is the top topic. The topic was thus discussed by both camps. This makes sense as posts including a politicization would naturally address both sides of the controversial debate.

Interestingly, the topic which is most balanced between skeptical and advocating positions is the discussion of the "presidential debate" (5) itself. For this topic, the number of skeptical and advocate sentences found in the posts was nearly equal. However, also these contested topics, where arguments both skeptical and alarmist were made, were all owned by the climate advocates (albeit weak sometimes).

These findings confirm that also the emphasized topics serve as an indicator that the blogosphere was used by climate advocates to push their positions and topics forward in the 2016 US presidential campaign.

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Figure 2: Relation between the frequency as top topic and the positions of the posts
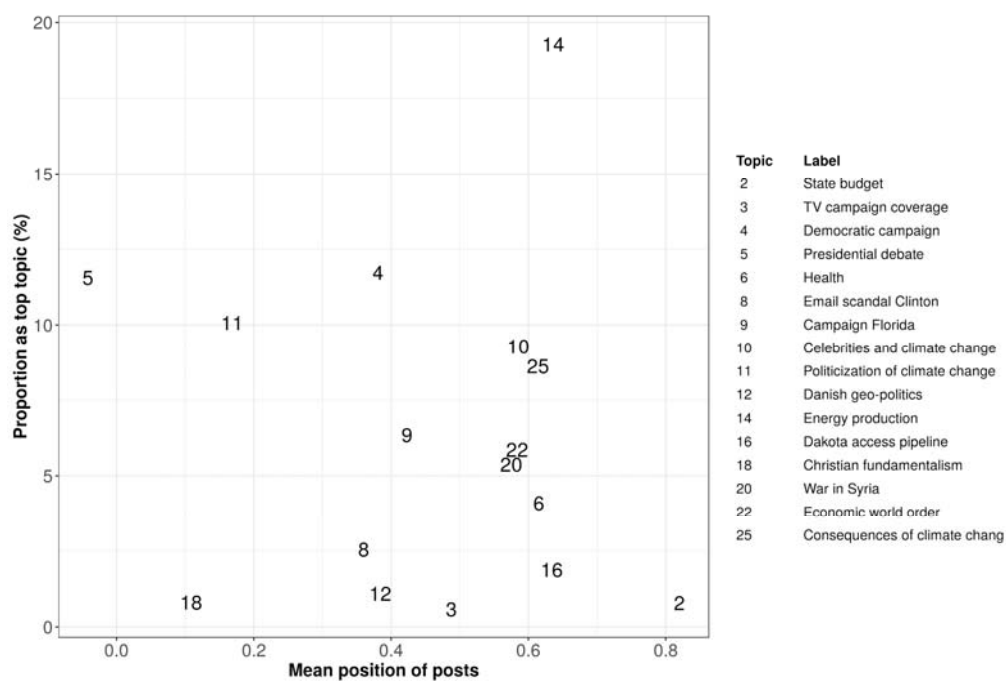
Basis: all posts with sentences containing a position (n=8'702)
Mean position of posts: -1=skeptical, 1=advocate

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Discussion

Even though climate change is one of the biggest societal challenges of our time and a controversial topic in the US, both top candidates of the 2016 US election, Hillary Clinton and Donald Trump, stayed more or less silent on the issue during the campaign. This political silence, as well as the fact that a prominent climate change skeptic had the chance to become the next US president, threatened the leading position of climate change advocates. Against this background, we asked whether the English-speaking blogosphere was used by climate change advocates to challenge the ignorance of the issue in the context of the 2016 US presidential campaign.

Overall, our findings strongly support the idea that blogs functioned as a counterpublic for climate change advocates in two ways. First, comparing the quantity of skeptical and advocating sentences posted over time reveals that climate-change advocates actively used the blogosphere to make their position increasingly salient, while skeptical arguments remained more or less stable and on a lower level. Moreover, the observation that the number of advocating sentences increased right after the presidential debates can be interpreted as an attempt to counteract the relative silence on the topic during the debates. Second, climate-change advocates not only dominated the blogosphere with respect to their overall activity, but also regarding the topics discussed. While there is no topic that was "owned" by climate-change skeptics—that is, a topic that only appeared in combination with skeptical arguments in the posts—there were three climate-relevant topics ("consequences of climate change", "celebrities and climate change", and "energy production") which were emphasized in posts containing a predominantly advocating position. However, it must be acknowledged that some topics were discussed in posts containing both advocating and skeptical positions (e.g. "politicization of climate change" and "presidential debate"). One possible interpretation is that skeptics picked up or attacked advocating positions in their posts. That skeptics referred

more often to advocating positions than advocates referred to skeptical ones has also been shown in previous research (Häussler et al., 2017). Thus, skeptics seem to have reacted to advocates more than they set their own topics and agendas, meaning that climate-change advocates dominated the blogosphere overall in terms of a higher salience of their positions and topics.

With regard to the concept of public spheres and counterpublic spheres, our results underline Fraser's assumption that multiple competing publics exist (1990). These publics compete with regard to interpretative dominance over certain issues. Depending on different contextual factors, the dominance of a public sphere is not static but can be challenged and may change over time. Additionally, our findings indicate that different publics interact with and react to each other, underlining that the relationship between a dominant public and its counterpublic may change over time. This becomes particularly apparent in the context of the 2016 US presidential campaign, when the English-speaking blogosphere was dominated by climate-change advocates, contradicting findings from previous studies in which the blogosphere was dominated by climate-change skeptics (Elgesem et al, 2015; Elgesem, 2017).

Our study shows that climate change advocates used the English-speaking Blogosphere to make the issue more salient , as their position had been neglected during the 2016 US presidential campaign. From a normative standpoint, thus, the view that was in danger to be excluded in the public debate was able to take advantage of the low-access barriers of online communication and the possibilities of establishing an alternative communication space. Furthermore, our study shows that the English-speaking blogosphere reacted to external events and was influenced by the character of the 2016 US presidential campaign.

However, while our study provides some insights into the relationship between different publics, other aspects remain unclear. For example, we do not know whether or how this online counter-mobilization translated into the offline world. It is possible that climate-change

advocates were only successful in communicating their topics and positions online without causing an echo in the wider public sphere. If so, this would mean that the permeability between different public spheres is not very pronounced. It also may be true that neither candidate had an interest in discussing climate change during the campaign. While silence on the issue surely benefits the Republicans, even Hillary Clinton might have benefited from this strategy in that it avoided the fact that the former (Democrat) administration was largely unsuccessful in adopting binding, comprehensive climate regulations.

Another limitation of our study is that we do not know exactly which external factors lead to shifts in the salience of different publics and thus to the success of the counterpublic, nor do we know whether these changes regarding societal discussion of the issue depended on certain characteristics. Further research should examine which factors can lead to such changes and study the dynamics of various publics for a variety of issues.

Additionally, as our study emphasizes the salience of different positions in the online discourse about climate change, it lacks data about the concrete position of the bloggers. This information would allow for deeper insights into the communicative strategies different actors pursued and further interpretation of whether skeptics reacted to advocating arguments or vice versa. Another limitation is that this study focuses on blogs that connected climate change to the presidential campaign. In this specific context, we found the advocating position was dominant, but we did not look at dominance with regard to the wider blogosphere.

References

Adam, S., Antl-Wittenberg, E.-M., Eugster, B., Leidecker-Sandmann, M., Maier, M., & Schmidt, F. (2016). Strategies of pro-European parties in the face of a Eurosceptic challenge. *European Union Politics, 18*(2), 260-282. doi:10.1177/1465116516661248

Anderegg, W. R. L., Prall, J. W., Harold, J., & Schneider, S. H. (2010). Expert credibility in climate change. *Proceedings of the National Academy of Sciences, 107*(27), 12107-12109. doi:10.1073/pnas.1003187107

Bar-Ilan, J. (2005). Information hub blogs. *Journal of Information Science, 31*(4), 297-307.

Baumgartner, F. R., & Jones, B. D. (1993). *Agendas and Instability in American Politics*. Chicago: University of Chicago Press.

Blei, D. M. (2012). Probabilistic topic models. *Communications of the ACM, 55*(4), 77–84.

Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent dirichlet allocation. *The Journal of Machine Learning Research, 3*, 993–1022.

Borenstein, S. (August 29, 2016). Why it Matters: Climate Change. Retrieved from https://apnews.com/4bc63552952c450eb13454f29663c674/why-it-matters-climate-change

Boussalis, C. & Coan, T. G. (2016) Text-mining the signals of climate change doubt. *Global Environmental Change, 36*, 89-100.

Boykoff, M., Daly, M., McAllister, L., McNatt, M., Nacu-Schmidt, A., Oonk, D., & Pearman, O. (2019). United States Newspaper Coverage of Climate Change or Global Warming, 2000-2019. Media and Climate Change Observatory Data Sets. Retrieved from: https://scholar.colorado.edu/mecco_data/122/

Boykoff, M. T. (2007). Flogging a dead norm? Newspaper coverage of anthropogenic climate change in the United States and United Kingdom from 2003 to 2006. *Area, 39*(4), 470–481. doi:10.1111/j.1475-4762.2007.00769.x

Brüggemann, M., & Engesser, S. (2017). Beyond false balance: How interpretive journalism shapes media coverage of climate change. *Global Environmental Change, 42*, 58-67. doi:https://doi.org/10.1016/j.gloenvcha.2016.11.004

Brulle, R. J. (2014). Institutionalizing delay: foundation funding and the creation of U.S. climate change counter-movement organizations. Climatic Change, 122(4), 681-694. doi:10.1007/s10584-013-1018-7

Bruns, A. (2007). Methodologies for Mapping the Political Blogosphere: An Exploration Using the IssueCrawler Research Tool. *First Monday, 12*(5).

Cammaerts, B. (2009). Radical pluralism and free speech in online public spaces. *International Journal of Cultural Studies, 12*(6), 555-575. doi:10.1177/1367877909342479

Cammaerts, B. (2012). Protest logics and the mediation opportunity structure. *European Journal of Communication, 27*(2), 117-134. doi:10.1177/0267323112441007

Cann, H. W. & Raymond, L. (2018). Does climate denialism still matter? The prevalence of alternative frames in opposition to climate policy. *Environmental Politics*, doi: 10.1080/09644016.2018.1439353

Dahlberg, L. (2011). Re-constructing digital democracy: An outline of four 'positions'. *New Media & Society, 13*(6), 855-872. doi:10.1177/1461444810389569

Dahlgren, P. (2005). The Internet, Public Spheres, and Political Communication: Dispersion and Deliberation. *Political Communication, 22*(2), 147-162. doi:10.1080/10584600590933160

Downey, J., & Fenton, N. (2003). New Media, Counter Publicity and the Public Sphere. *New Media & Society, 5*(2), 185-202. doi:10.1177/1461444803005002003

Dunlap, R. E., McCright, A. M., & Yarosh, J. H. (2016). The Political Divide on Climate Change: Partisan Polarization Widens in the U.S. *Environment: Science and Policy for Sustainable Development, 58*(5), 4-23. doi:10.1080/00139157.2016.1208995

Eckert, S., & Chadha, K. (2013). Muslim bloggers in Germany: an emerging counterpublic. *Media, Culture & Society, 35*(8), 926-942. doi:10.1177/0163443713501930

Elgesem, D. (2017). Polarization in Blogging About the Paris Meeting on Climate Change. In G. L. Ciampaglia, A. Mashhadi, & T. Yasseri (Eds.), *Social Informatics: 9th International Conference, SocInfo 2017, Oxford, UK, September 13-15, 2017, Proceedings, Part I* (pp. 178-200). Cham: Springer International Publishing.

Elgesem, D., Steskal, L., & Diakopoulos, N. (2015). Structure and Content of the Discourse on Climate Change in the Blogosphere: The Big Picture. *Environmental Communication, 9*(2), 169-188. doi:10.1080/17524032.2014.983536

Elsasser, S. W., & Dunlap, R. E. (2013). Leading Voices in the Denier Choir: Conservative Columnists' Dismissal of Global Warming and Denigration of Climate Science. *American Behavioral Scientist, 57*(6), 754-776. doi:10.1177/0002764212469800

Fan, R., Chang, K., Hsieh, C., Wang, X. & Li, C. (2008). LIBLINEAR: A Library for Large Linear Classification. *Journal of Machine Learning Research, 9*, 1871–74.

Farrell, H. & Drezner, D. W. (2008). The power and politics of blogs. *Public Choice, 134*, 15-30.

Faris, R. M., Roberts, H., Etling, B., Bourassa, N., Zuckerman, E., & Benkler, Y. (2017). Partisanship, Propaganda, and Disinformation: Online Media and the 2016 U.S.

Presidential Election. Retrieved from http://nrs.harvard.edu/urn-3:HUL.InstRepos:33759251

Fraser, N. (1990). Rethinking the Public Sphere: A Contribution to the Critique of Actually Existing Democracy. *Social Text*(25/26), 56-80. doi:10.2307/466240

Gamson, W. A. (1988). Political discourse and collective action. *International Social Movement Research, 1*, 219-244.

Häussler, T., Adam, S., Schmid-Petri, H. & Reber, U. (2017). How Political Conflict Shapes Online Spaces: A Comparison of Climate Change Hyperlink Networks in the United States and Germany. *International Journal of Communication*, 11

Helleputte, T. (2017). LiblineaR: Predictive models based on the LIBLINEAR C/C++ library. R package version 2.10-8. Retrieved from https://cran.r-project.org/web/packages/LiblineaR/index.html

Joachims, T. (1998). Text categorization with support vector machines: learning with many relevant features. Available online: http://www.cs.cornell.edu/people/tj/publications/joachims_98a.pdf.

Kaiser, J. (2017). Public Spheres of Skepticism: Climate Skeptics' Online Comments in the German Networked Public Sphere. *International Journal of Communication, 11*, 1661–1682.

Maier, D., Waldherr, A., Miltner, P., Wiedemann, G., Niekler, A., Keinert, A., Pfetsch, B., Heyer, G., Reber, U., Häussler, T., Schmid-Petri, H. & Adam, S. (2018). Applying LDA topic modeling in communication research: Toward a valid and reliable methodology. *Communication Methods and Measures, 12*(2-3), 93-118.

Meyer, D. S. (1993). Protest Cycles and Political Process: American Peace Movements in the Nuclear Age. *Political Research Quarterly, 46*(3), 451-479. doi:10.1177/106591299304600302

Meyer, D. S., & Minkoff, D. C. (2004). Conceptualizing Political Opportunity*. *Social Forces, 82*(4), 1457-1492. doi:10.1353/sof.2004.0082

Meyer, D. S., & Staggenborg, S. (1996). Movements, Countermovements, and the Structure of Political Opportunity. *American Journal of Sociology, 101*(6), 1628-1660.

Mimno, D. (2013). A wrapper around the Java machine learning tool MALLET. Available online: https://cran.r-project.org/web/packages/mallet/mallet.pdf

Nuernbergk, C. (2013). *Anschlusskommunikation in der Netzwerköffentlichkeit. Ein inhalts- und netzwerkanalytischer Vergleich der Kommunikation im „Social Web" zum G8- Gipfel von Heiligendamm.* Baden-Baden: Nomos.

Oreskes, N. (2004). The Scientific Consensus on Climate Change. *Science*, 306(5702), 1686- 1686. doi:10.1126/science.1103618

Painter, J. & Ashe, T. (2012). Cross-national comparison of the presence of climate scepticism in the print media in six countries, 2007–10. *Environmental Research Letters, 7*(4), 044005.

Papacharissi, Z. (2002). The virtual sphere. *New Media & Society, 4*(1), 9-27. doi:10.1177/14614440222226244

Park, D. W. (2009). Blogging With Authority: Strategic Positioning in Political Blogs. *International Journal of Communication*, 3, 250-273. Retrieved from http://ijoc.org/index.php/ijoc/article/view/355/308

Pew Research Center. (July 7, 2016). 2016 Campaign: Strong Interest, Widespread Dissatisfaction. Retrieved from http://www.people-press.org/2016/07/07/2016- campaign-strong-interest-widespread-dissatisfaction/

Rasmussen, T. (2014). Internet and the Political Public Sphere. Sociology Compass, 8(12), 1315-1329. doi:10.1111/soc4.12228

Riegert, K., & Ramsay, G. (2013). Activists, Individualists, and Comics. *Television & New Media, 14*(4), 286-303. doi:10.1177/1527476412463447

Schäfer, M. S. (2012). Online communication on climate change and climate politics: a literature review. *Wiley Interdisciplinary Reviews: Climate Change, 3*(6), 527-543. doi:10.1002/wcc.191

Schmid-Petri, H., Adam, S., Schmucki, I., & Häussler, T. (2017). A changing climate of skepticism: The factors shaping climate change coverage in the US press. *Public Understanding of Science, 26*(4), 498-513. doi:10.1177/0963662515612276

Settles, B. (2010). Active learning literature survey. Retrieved from http://burrsettles.com/pub/settles.activelearning.pdf

Sevin, E., & Uzunoğlu, S. (2017). Do Foreigners Count? Internationalization of Presidential Campaigns. *American Behavioral Scientist, 61*(3), 315-333. doi:10.1177/0002764217701215

Sharman, A. (2014). Mapping the climate sceptical blogosphere. *Global Environmental Change, 26*, 159-170. doi:http://dx.doi.org/10.1016/j.gloenvcha.2014.03.003

Sidahmed, M., Puglise, N., & Diehm, J. (2016). What did Clinton and Trump talk about in the debates - and for how long? *the Guardian*. Retrieved from https://www.theguardian.com/us-news/2016/oct/22/clinton-trump-debate-analysis-foreign-policy-economy-scandals

Toepfl, F., & Piwoni, E. (2015). Public Spheres in Interaction: Comment Sections of News Websites as Counterpublic Spaces. *Journal of Communication, 65*(3), 465-488. doi:10.1111/jcom.12156

Toepfl, F., & Piwoni, E. (2017). Targeting dominant publics: How counterpublic commenters align their efforts with mainstream news. *New Media & Society*, 1461444817712085. doi:10.1177/1461444817712085

Wallsten, K. (2007). Agenda Setting and the Blogosphere: An analysis of the relationship between mainstream media and political blogs. *Review of Policy Research, 24*(6), 567-587.

DYNAMIC PERSPECTIVE ON PUBLICS AND COUNTERPUBLICS

Appendix

Table 1: Identified topics in the blog posts corpus

topic	Label	Top words	overall probability
1	not interpretable	university california institute science harvard environmental engineering climate national press	.08
2	State budget	obama year president rate million billion sales trillion house economy	.01
3	TV campaign coverage	cnn news tv coverage trump breaking complete obama mobile republican	.01
4	Democratic campaign	clinton party people hillary vote president election trump sanders democratic	.08
5	Presidential debate	trump clinton donald hillary debate presidential campaign obama president republican	.09
6	Health	water health food environmental species public study research science zika	.03
7	not interpretable	temple press city group gold general ban guides yahoo south	.01
8	Email scandal Clinton	clinton hillary foundation emails shared fbi news million story russia	.02
9	Campaign Florida	state florida senate campaign republican house percent court district election	.06
10	Celebrities and climate change	climate change flag global warming news science pope world gore	.07
11	Politicization of climate change	change climate science people question global fact warming political public	.09
12	Danish geo-politics	denmark danish islands world union country greenland government war sweden	.01
13	not interpretable	manual bank solution test international human-management accounting edition introduction	.01
14	Energy production	energy climate carbon gas emissions change coal oil power agreement	.12
15	not interpretable	posted pops pronk jul download listen show Germany podcast shows	.01
16	Dakota access pipeline	pipeline news dakota india access standing rock google fire friendly	.01
17	not interpretable	people time women read day back life make years good	.07
18	Christian fundamentalism	kjv god earth prophecy jesus lord world axiom man beast	.01
19	not interpretable	news space link read world watch video click science published	.02
20	War in Syria	news war hours russia syria china ago military president united	.04
21	not interpretable	news trump york clinton articles ap times police reuters donald	.02
22	Economic world order	world people global economic social human united war political states	.05
23	not interpretable	america media hillary government people american obama world war black	.04
24	not interpretable	tax people government jobs health care federal americans clinton income	.05
25	Climate change impacts	climate hurricane change sea weather warming ice global years year	.06

DYNAMIC PERSPECTIVE ON PUBLICS AND COUNTERPUBLICS

Table 2: Frequency of the top topics of the posts

Topic	Frequency as top topic (%)
Energy production	19.3
Democratic campaign	11.7
Presidential debate	11.6
Politicization of climate change	10.1
Celebrities and climate change	9.3
Consequences of climate change	8.6
Campaign Florida	6.4
Economic world order	5.9
War in Syria	5.4
Health	4.1
Email scandal Clinton	2.6
Dakota access pipeline	1.9
Danish geo-politics	1.1
Christian fundamentalism	0.8
State budget	0.8
TV campaign coverage	0.6

Basis: all posts with sentences with a position n=8'702