

(How) do participants in online discussion forums create ‘echo chambers’? The inclusion and exclusion of dissenting voices in an online forum about climate change

Do participants in online forums create echo chambers?

Journal of Argumentation in Context (2013): 127-150.

<http://benjamins.com/#catalog/journals/jaic.2.1/main>.

The publisher should be contacted for permission to re-use or reprint the material in any form.

Arthur Edwards (Erasmus University, Rotterdam)

edwards@fsw.eur.nl

Abstract: This paper examines the proposition advanced by Sunstein (2001) and other scholars that political online forums tend to be characterized by in-group homogeneity and group polarization. The paper adopts a process view of online forums and examines discussions within a time perspective. Five discussion lines on *Climategate.nl* (a skeptical Dutch online forum on climate change) are investigated. The research focuses on how participants react to the participation of dissidents and on the resulting processes of inclusion and exclusion. *Climategate.nl* moved in the direction of an ‘echo chamber’ gradually over time. Nevertheless, the forum was never completely homogeneous. The editors played an active role in the inclusion and exclusion of dissidents. A counter-steering moderation policy is needed to keep group polarization and homogenization within certain limits.

KEYWORDS: argumentative community, balkanization, counter-steering moderation, echo chamber, in-group homogeneity, online discussion forums

AUTHOR BIO:

Dr. Arthur Edwards is Associate Professor in the Department of Public Administration at Erasmus University Rotterdam. He co-edited the book *Governance and the Democratic Deficit* (with V. Bekkers, G. Dijkstra and M. Fenger, 2007). His publications include various journal articles and book chapters about e-democracy, e-participation, and social media usage in political processes.

MAILING ADDRESS: edwards@fsw.eur.nl

(How) do participants in online discussion forums create ‘echo chambers’? The inclusion and exclusion of dissenting voices in an online forum about climate change

1. *Introduction*

According to the deliberative model of democracy, public deliberation is aimed at the transformation of private opinions on public issues into viewpoints that can withstand public scrutiny and criticism (Held 2006). This assumes that citizens engage with opposing points of view rather than seeking to reinforce their existing points of view. Exposure to conflicting viewpoints fosters political tolerance, which includes the capacity to see that both sides in a political controversy have legitimate rationales for their views (Mutz 2002:122). Several scholars have investigated the expectation that the internet extends the ‘public sphere’ for argumentative discussions, as envisaged by deliberative theory (e.g., Dahlberg 2001; Papacharissi 2002; Kies 2010). Cass Sunstein (2001; 2009) adopts a relatively skeptical position that has been highly influential within the scholarly literature concerning online political deliberation. He argues that the domain of online discussion spaces tends to be fragmented, such that forums attract politically like-minded people (‘balkanization’). If exposures to competing views are lacking, balkanization produces ‘echo chambers’ and inevitably leads to group polarization. As a result, prospects for critical argumentative discussion and opportunities for finding common ground between different points of views are seriously diminished. Sunstein (2010:5-10) holds that the internet facilitates balkanization because the technology increases the

ability of individuals to filter their exposure to information, thus creating personalized communication environments.

This paper aims to develop additional insight into homogenization and polarization. In order to accomplish this aim, I develop a conceptual and methodological framework with three key elements. The first element is contextualization. Much of the existing empirical research is limited to descriptions of ideological homogeneity of messages, that is the degree of plurality of the standpoints and arguments expressed in online discussions. Although the findings are inconclusive, they suggest that contextualization is essential to understanding why homogeneity can be found in some forums and not (or less) in others. Secondly, I propose considering an online forum as an ‘argumentative community’ that is typified by a shared perspective with regard to the purpose of the discussions and by specific standards that govern argumentative activity. I proceed from the assumption that the interaction between mainstream participants and dissidents is a particular aspect of the processes by which an argumentative community is constituted. Research on processes of inclusion and exclusion of dissidents can provide additional insight into homogenization, along with research on self-selection that takes place when people choose to participate in a given forum (e.g., Hill and Hughes 1998). The third element of the framework consists in a methodological focus on the dynamics of the argumentation practices within online forums. A process view is helpful for understanding homogenization in addition to static descriptions of the degree of plurality of messages.

The empirical research focuses on two questions: (1) Which processes of participant inclusion and exclusion take place? and (2) How are these processes

manifested in communication between participants? The study involves the analysis of instances of meta-communication, in which participants evaluate their discussions and draw implications with regard to further participation. The object of the research is the Dutch online forum *Climategate.nl*, which was established in November 2009 by two scientific journalists who hold skeptical views on climate change. The term ‘Climategate’ refers to the controversy following the hacking of e-mails from the University of East Anglia’s Climatic Research Unit in November 2009 (explained below).

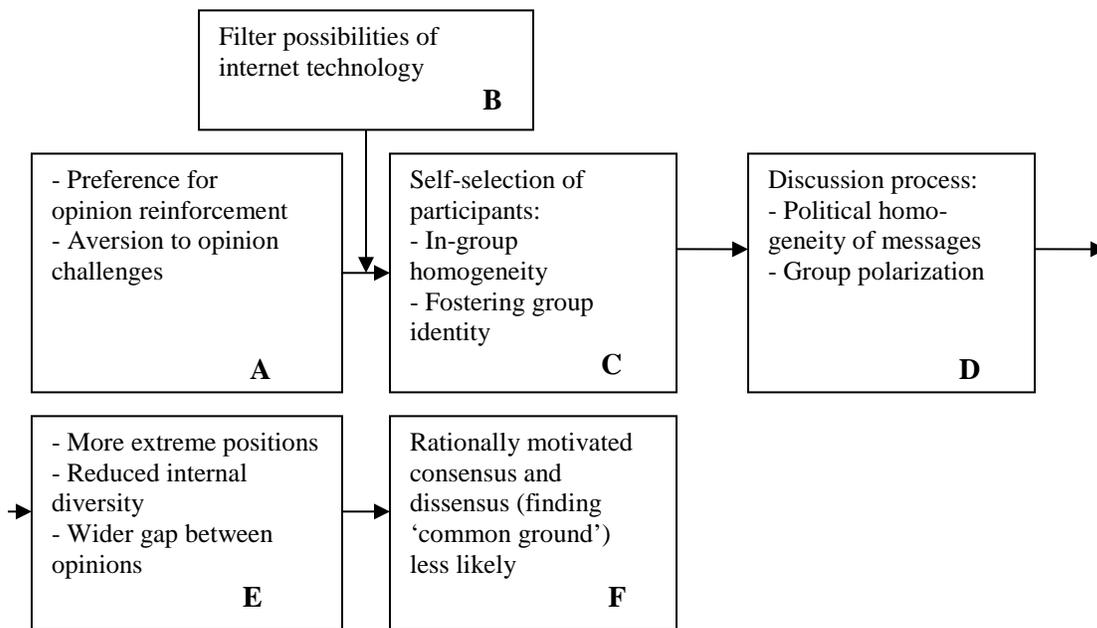
Section 2 presents a brief reconstruction of the causal line of reasoning that underlies Sunstein’s argument on balkanization. In Section 3 I develop the conceptual and methodological framework. Section 4 elaborates the research design. Section 5 presents the analysis of five discussion lines on *Climategate.nl*. Conclusions and implications of this study are discussed in Section 6.

2. Theoretical and empirical exploration

I open this exploration by outlining the causal chain implied in Sunstein’s argument. Figure 1 presents the basic structure of these causal relationships. After discussing Sunstein’s argumentation, I provide a short review of empirical research. The main purpose of this review is to specify the intended contribution of my own research in this paper. The discussion also identifies several contextual factors that seem to be important for understanding homogenization and polarization in online forums.

[Figure 1 about here]

Figure 1: Outline of Sunstein’s argumentation about balkanization and group polarization in political online discussion forums



Sunstein proceeds from the proposition that “there is a natural tendency to make choices, with respect to entertaining and news, that do not disturb our preexisting view of the world” (Sunstein 2001:57). This hypothesis is supported by literature in the area of political communication (e.g., Huckfeldt and Sprague 1995). Kevin Hill and John Hughes (1998) conducted one of the first investigations into online forums (Usenet groups and chat rooms) to build upon this literature. They present a mixed picture but conclude that Usenet “is something people use to reinforce beliefs they have already developed” (Hill and Hughes 1998:72). In a study of selective exposure among internet news users, Kelly Garrett (2009) distinguishes between two psychological mechanisms: the desire for

opinion reinforcement and the aversion to opinion challenges (see Box A in Figure 1). Garrett's research indicates that the two tendencies are not equivalent and that opinion-reinforcement plays a more important role than does the avoidance of opinion-challenging information (see also Kobayashi and Ikeda 2009). These findings seem to weaken Sunstein's thesis on balkanization, because they imply that, even if people prefer to participate in forums with politically like-minded people, they might still be interested in the participation of at least some people with dissenting opinions. Participation of opponents constitutes an opportunity to shape their own ideas or to ventilate their views to the outside world (De Koster 2010:176).

The core of Sunstein's argument emerges in an experiment he conducted with two colleagues involving face-to-face deliberation (Schkade et al. 2007). In the experiment, 63 American citizens were brought together and assembled into ten groups, to which the following three issues were assigned: same-sex marriage, affirmative action, and global warming. In the design of this experiment, the relatively loose term 'like-minded people' refers to ideological positions rather than to positions on these specific issues. Five groups were established with members tending toward liberal positions, and five were established with conservative-leaning members. Participants were asked to state their opinions anonymously, both before and after fifteen minutes of group discussion on each topic. The experiment yielded three critical findings (see Box E in Figure 1):

1. In almost every group, the positions of the participants became more extreme.
2. The diversity of opinions within the groups became markedly lower.
3. As a result, the discussion widened the gap between liberals and conservatives.

It is quite remarkable that a group discussion of only 15 minutes on a complex public issue could generate such results. It is unclear, however, whether notions like ‘more extreme positions’ and ‘group polarization’ provide an adequate account of what actually happened in these discussions. It could be that the discussion served to transform privately held opinions into better-articulated points of view and arguments, which can be seen as a precondition for or the first step towards a more thorough discussion of the issues at a later stage. Moreover, because Sunstein and colleagues did not include a heterogeneous group in their experiment, we do not know whether polarization between liberals and conservatives would also occur when they engage in a discussion with each other.

It is conceivable that internet technology (Box B) facilitates the causal relationship of preference for opinion reinforcement with self-selection. Empirical research on how people actually use the possibilities of the internet for opinion reinforcement and self-selection is scarce. There is thus little insight into the extent to which people make choices among specialized websites or use specific technologies that enable them to filter information. Thomas Johnson and colleagues (2009) establish that 53% of those who visit blogs for political information seek blogs that share their points of view, as compared to 22.2% who seek blogs that challenge their points of view.

This paper focuses on the relationship between Boxes C and D (see Figure 1). According to Sunstein (2001), in-group homogeneity generates group polarization, particularly if the members consider themselves as part of a group that has a shared identity or common interest, such as opponents of high taxes, or advocates of animal rights. Their discussions are likely to move them in quite extreme directions (Sunstein

2001:70). In a study of online neo-Nazi discussion forums, Magdalena Wojcieszak (2010) highlights the social mechanisms in online forums that can further these tendencies. The first mechanism is informational influence, whereby members accept the arguments of other participants as valid evidence. Online groups may also increase polarization and extremism by exerting normative pressure. Affinity among members in homogeneous groups might encourage them to adjust their opinions to the views prevalent within the group. Empirical evidence on the degree of plurality of opinions and arguments expressed in online discussions is, however, inconclusive. Anthony Wilhelm's research on political Usenet newsgroups during the 1996 presidential campaign in the United States, revealed that the exchange of opinions between message posters with diverse viewpoints occurred infrequently (Wilhelm 2000). From a list of 57 self-identified political forums, Wilhelm randomly selected six forums for content analysis. More than 70% of messages were relatively uniform in their expressed viewpoint. Other investigations, however, point in another direction. Liza Tsaliki (2002) examined sixteen online discussions in Greece, the Netherlands, and Britain during various periods in 2000 and 2001. She found great variation in viewpoints expressed by debaters. Christian Fuchs (2006) examined a discussion board regarding national politics on the Austrian online forum *politik-forum.at*. He concludes that, in a vast majority of postings (84.1%), no clear identification with particular political ideologies or parties could be found (Fuchs 2006:16). The findings of Tsaliki and Fuchs seem to point to the importance of the institution hosting the debate, including a quality newspaper (*The Guardian* in Tsaliki's four British discussion threads) and an independent individual host (in the Austrian case). In an analysis of a forum of the Italian *Partito Radicali*, an anticlerical, liberal party,

Raphaël Kies (2010:138) concludes that, although the forum tends to be used by members and sympathizers of the radical community, these “*do not* lead to a homogenization and polarization of opinions” (his italics). He suggests that this may be a consequence of the great political openness and taste for polemical debates typical of the Italian Radicals.

This short review of research findings refutes the idea that online forums necessarily function as echo chambers for politically like-minded people. On the contrary, the results point to the importance of specific contextual characteristics. Kies (2010) mentions several of these factors. One group of factors involves the nature of the initiators or the institution hosting the debate (e.g., newspaper, political party, governmental institution, independent host), its ideological orientation, and communicative culture. Another group of factors involves the design of the online forums (e.g., the moderation policy; see Wright and Street 2007), and what Kies refers to as the pursued ‘external impact’ of the discussion. This factor aligns with Marcin Lewiński’s (2010) distinction between online forums that are aimed at decision-making and those that are aimed solely at opinion-formation. Kies (2010:108) hypothesizes that forums that are aimed at exercising influence on decision-making are less prone to homogenization, because the possibility of exercising political influence will be a strong motive for all persons who have a particular interest in the issues to express an opinion. My conclusion is that contextualization is crucial to the understanding of online discussions. The literature review suggests several contextual factors that have to be taken into account. In the next section they are brought together within a conceptual framework.

3. *Political online forums as argumentative communities*

The concept of an ‘argumentative community’ can be used for charting various contextual as well as internal factors impinging on political online discussions. Raymie McKerrow (1990) has elaborated a model of argumentation from a community perspective:

That is, communities are typified by the specific rules which govern argumentative behaviour, by social practices which determine who may speak with what authority, and by their own ‘display’ of these rules and social practices in response to challenges from within or outside the community. (1990:28)

McKerrow subdivides argument communities according to primary context (i.e., personal, social, technical, and philosophical communities) and secondary context, which refers to a specific domain (e.g., law or medicine). He also distinguishes a ‘generic’ context, which refers to allegiance or opposition to a nation, state, or class. Within the primary context, McKerrow mentions the social community which refers to argumentation between individuals who inhabit the public sphere of discourses in which collective preferences about societal problems are formed (Habermas 1962/1989). In other words, McKerrow’s concept of social community involves a *political* community of citizens. The (Dutch) public sphere provides a contextualization for the online forum *Climategate.nl* within the primary context. The issue domain of climate change (McKerrow’s secondary context) is characterized by deep normative controversies in terms of values, belief systems, and attitudes towards risks, in addition to a high level of

uncertainty regarding the available knowledge. The ‘climate skeptics’ (to whom the initiators of *Climategate.nl* belong) share an oppositional orientation to the climate policies pursued by national and international governmental actors (generic context).

The argumentative community concept can be related to the concept of argumentative activity types existing within the pragma-dialectical theory of argumentation (van Eemeren et al. 2010; van Eemeren 2011). The term ‘argumentative community’ refers to a sociological concept that involves concrete social systems embedded within specific temporal and spatial settings. ‘Argumentative activity type’ refers to a concept within the study of argumentation. Frans van Eemeren and colleagues (2010:128) define argumentative activity types as “generally recognized empirical entities of observable communicative practices that share certain basic goals and conventions.” They mention parliamentary debates, legal indictments, and internet forums as examples of argumentative activity types. Although the two concepts are different and have different disciplinary origins, they can complement each other in empirical research. The concept of argumentative activity types can inform the sociological analysis of an argumentative community by indicating how argumentation stages can be distinguished, or by suggesting typical rules for argumentative conduct or other relevant frameworks. For instance, in the context of the argumentative activity type of internet forums, Lewiński (2010:156-157) observes that arguers tend to outsource the defense of their perspectives to purportedly authoritative online resources. Providing links is an important norm of conduct in online discussions. This shifts the emphasis from the acceptability of the arguments used to the acceptability of the authority of the sources. The concept of argumentative communities can inform the pragma-dialectical analysis of

online discussions by indicating relevant community aspects. An example in discussions about climate change concerns the prominence of the authority argument. The credentials of specific scientific sources provide an important yardstick by which participants in the climate change debate commonly evaluate each other's contributions.

The application of the argumentative community concept aligns well with the 'virtual community' notion, which has become commonplace in the study of online forums. In a review of the literature on the 'online community question', Willem de Koster (2010) observes that most studies are directed toward or dependent upon specific conceptualizations of "what a community is." This can lead either to essentialist approaches to the conceptualization of community or to dichotomous research outcomes, following the logic that a particular entity does or does not constitute a community. De Koster (2010:9) prefers to use community as a 'sensitizing concept', in order "to keep an open eye for the different meanings that online interaction may have for different users." In my research, I take a further step away from the essentialist approach by adopting a process view of virtual communities. With the exception of the literature on 'communities of practice', this approach is rare. A process approach allows for the contextualization of online discussions within a time perspective. Communities are constantly reproducing themselves. In this process, their shared identities, purpose, and norms are constantly reformulated. Newcomers move from being peripheral members to become active contributors (Lave and Wenger 1991), although the opposite may occur as well.

The next step is to identify the standards for argumentative activity that are shared within an argumentative community. I consider the standards to involve the following:

(1) the acceptability of the propositional content of argumentation, (2) the authority of the arguer and sources, and (3) the norms for argumentative conduct. For the case study presented in this paper, the relevant argumentative communities are the skeptical online discussion forums on climate change. Skeptical websites include those that are relatively detached and science-based (e.g., *climateaudit.org*), as well as sites that are more popular in tone (e.g., *wattsupwiththat.com*). Climate skeptics deny that the problem of climate change is serious enough to call for costly mitigation policies. Various lines of argumentation can be used to support this point of view. For example, some skeptics deny that significant global warming has taken place at all. Others acknowledge the reality of global warming but argue that it is not anthropogenic; yet others acknowledge that it is (partly) anthropogenic, but argue that the climate system's sensitivity to greenhouse-gas emissions is relatively low.¹ According to Elizabeth Malone (2009), various 'families of argument' can be identified within the climate change debate. She suggests that the credentials and standing of the arguer are likely to influence the reception of the argumentation by the audience. Within the debate on climate change, the authority, credibility, and trustworthiness of sources are often strongly contested. The communicative culture in both camps is highly adversarial (Ereaut and Segnit 2006, 2007). This characteristic has a clear impact on argumentative conduct, leading to *ad hominem* attacks and other violations of the rules of critical discussions (van Eemeren and Grootendorst 1992).

Figure 2 provides an overview of the external and internal factors that I consider to be involved in processes of the inclusion and exclusion of participants. All of the contextual factors are related to the extra-linguistic context of online political discussions.

For this reason, the distinctions between the macro, meso, and micro contexts are different from the distinctions described by van Eemeren (2011), although there is overlap on the macro level on which van Eemeren’s analysis is concentrated. On this level, he mentions deliberation as a genre of communicative activity in the political domain, which includes the public sphere.

[Figure 2 about here]

Figure 2: Internal and external factors impinging upon political online discussions

External factors: context	Internal factors: elements constituting argumentative communities
<p><i>Macro context</i></p> <ul style="list-style-type: none"> - Specific public sphere (e.g., at the national level) and its institutional conventions - Issue domain <p><i>Meso context</i></p> <ul style="list-style-type: none"> - Group of people with a shared identity, interest or similar points of view - Communicative culture within this group of people - Hosting institution and its communicative culture <p><i>Micro context</i></p> <ul style="list-style-type: none"> - Pursued impact on political decision-making - Forum design, including technical design (e.g., blog with editorials) and moderation policy - Position of discussion in the life-cycle of the forum 	<p>[constant re-interpretation of:]</p> <ul style="list-style-type: none"> - Purpose of discussions - Acceptability of arguments - Authority of arguers and sources - Norms for argumentative conduct

4. *Research design*

In this section I explain the selection of the online forum *Climategate.nl*, the selection of specific discussion lines, and the method of analysis.

The online forum Climategate.nl

In the period between November 2009 and February 2010, two ‘focusing events’ (Kingdon 1984) occurred within the international arena of climate politics. On 20 November 2009, several thousand e-mails and other documents belonging to researchers of the University of East Anglia’s Climatic Research Institute were copied to various locations on the internet. This occurred several weeks before the Copenhagen Summit on climate change. The hacking incident and its aftermath came to be known as the ‘Climategate affair’. In late January 2010, one month after the Copenhagen Summit, an error regarding the meltdown of the Himalayan glaciers was identified in the 2007 assessment report published by the Intergovernmental Panel on Climate Change (IPCC). Other errors in the report were brought to light as well. The publicity about the e-mail hacking incident and especially about the errors in the IPCC report had important political effects in the Netherlands. The prevailing view among the policymakers was that these errors would seriously damage their public line of defense regarding the scientific basis of climate policy. During the heat of public controversy, the Ministry responsible for climate policy commissioned an investigation regarding the discussions on Dutch online forums in the period February-March 2010. This investigation revealed that the

online discussions at that time were characterized by strong polarization. Moreover, the online debate seemed to exhibit a high degree of balkanization. According to the researchers, protagonists and antagonists were hardly able to meet each other at all (*Politiek Online*, 2010). The discussions were marked by strong distrust in government and science.

Shortly after the e-mail hacking incident, the *Climategate.nl* forum was established. The initiators, Marcel Crok and Hajo Smit, were two science journalists with expertise on climate change. In their mission statement, they argued that the e-mails gave the impression that a worldwide ‘team’ of influential climate researchers had manipulated data, excluded skeptics from the scientific literature, and been unwilling to share their measurements and software programs with skeptics, despite the Freedom of Information Act in the UK:

Our mission is therefore to provide daily reports – in Dutch – on the consequences of Climategate [...] We will attempt to surprise our readers with original analyses, combined with references to articles in the scientific literature, foreign media and the many climate-related blogs and websites that report about Climategate. With the reaction option, we would also like to provide a platform for a respectful and fruitful discussion.

A contextualization of *Climategate.nl* indicates why this online forum is an interesting case in view of the research aims. At the macro-level, the forum can be placed within the Dutch public sphere. Although climate change is a global issue, the initiators explicitly

aim to address the Dutch-speaking public. Above, I already indicated the deep normative and empirical controversies that characterize the issue domain of climate change. At the meso-level, the editorial team can be equated with the hosting institution. Although all of the editors are climate skeptics, who share a highly adversarial communicative culture, the interviews conducted with the two initiators indicate that they adopt different orientations towards the fruitfulness of discussions between ‘skeptics’ and ‘alarmists’, and that they have different styles of verbal communication. In the micro-context, *Climategate.nl* belongs to the argumentative activity subtype of online discussions that are aimed solely at opinion formation. With regard to the design of the forum, several discussion rules were introduced in June 2010. This contextualization suggests that *Climategate.nl* will be marked by inherent tensions. Contextual factors at the macro- and meso-level seem to make it prone to group polarization and homogenization. On the other hand, if the aim expressed in the mission statement, to provide a platform for a respectful and fruitful discussion is elaborated in the moderation policy, this would constitute a counter-steering factor at the micro-level. The empirical research should reveal how this tension developed in the course of discussions.

Data selection

The data selection covers the period of December 2009 through May 2011. The initial selection of editorials and ensuing discussion lines (totaling more than 1,000) included the first three months and the last three months of this period, as well as five months selected alternately from the intervening period. Within this selection of 11 months, a further selection was made in order to include editorials written by the two initiators of

the website and one other prominent editor, in proportion to their share in the total number of editorials. The editorials are archived in groups of about one week. In most cases, the editorial that had elicited the greatest number of reactions, generally between 20 and 50, was selected for inclusion in the sample. This procedure generated a sample of 36 discussion lines. The final sample of five was composed by selecting the discussion lines in which (a) a discussion had taken place between participants adhering to alarmist and skeptical orientations and (b) meta-communication had taken place in which the participation of one or more participants was thematized. The distribution of the fragments over the entire period is as follows:

Fragment A: 8-12 December 2009

Fragment B: 17 January – 3 February 2010

Fragment C: 14-21 June 2010

Fragment D: 18-21 April 2011

Fragment E: 27 April – 2 May 2011

In order to gather background information, interviews were conducted with the two initiators of *Climategate.nl*.

Method of analysis

As indicated in the introduction, this research focuses on two questions: (1) Which processes of participant inclusion and (self-)exclusion take place? and (2) How are these processes manifested in communication between participants? The first research question is elaborated in the following three sub questions:

1.1 Who are the participants in the discussion, particularly in terms of their view on climate change, and what are the main topics?

1.2 How do participants evaluate the discussion, and which implications do they draw with regard to further participation (self-exclusion, exclusion or inclusion)?

1.3 How are the editors involved in this process?

The second question will be dealt with by answering the following two sub questions:

2.1 How do participants refer to elements that constitute an argumentative community (specified in Table 2)?

2.2 How are the editors involved in this process?

For the analysis of the selected discussion lines, a combination of content analysis and argumentation analysis is used. Content analysis is used for identifying the main elements that are implicated in the five sub questions. In the analysis I will directly link back to these questions. Argumentation analysis is used for the analysis of how norms for argumentative conduct are thematized by participants. I follow the perspective developed by Frans van Eemeren and Rob Grootendorst (1992), who analyze fallacies as violations of rules for critical discussion.

5. Analysis

Fragment A: 8-12 December 2009

This discussion line opens with an editorial by Marcel Crok discussing the hostile response of the international climate community to McIntyre's criticism of the famous 'hockey stick curve'.² The participants in this discussion (20 reactions) include the two

primary editors of *Climategate.nl*, three other skeptical participants, and one other participant, Ernst Schrama, who defends the alarmist position (question 1.1). Schrama is a researcher at Technical University Delft and is specialized in satellite measurements. He strongly rejects the idea that the hacked e-mails revealed a plot by climate scientists to fight the skeptics. The discussion further centers on the issue of whether the existence of the greenhouse effect (which can be proved in a laboratory) warrants the proposition that carbon dioxide emissions cause global warming. The discussion appears to become slightly polarized. At one point, Schrama comments:

I thought that I was providing information, but the debate is quickly degenerating into the *ad hominem* form. It is only a tiny step away from personal threats and other misery. I prefer not to visit this website anymore.

Editor Smit then intervenes:

It would be a pity if you were not to return to this forum. In this debate, we especially need people like you, who combine passion and knowledge.

Smit continues by providing an extensive argumentation for why the existence of the greenhouse effect says nothing about global warming. The discussion is concluded by participant *Woedende Kok* with the following post directed at Schrama:

I've never claimed to be Herman van Veen [a Dutch singer and cabaret artist known for his sweet and mild-tempered texts, AE], but fair is fair. You were also quite eager to hurl pejoratives with your *Titulaartjes* and 'Oompjes' [against the skeptics, AE].

The substance of this fragment, which took place about two weeks after the start of *Climategate.nl*, is straightforward. The discussion centers on two basic themes: the integrity of climate scientists and the relationship between the greenhouse effect and global warming (question 1.1). A Dutch climate scientist, clearly a dissident in this forum, feels snubbed by other participants and announces that he intends to leave the forum – an intention directed at self-exclusion (question 1.2). Editor Smit tries to restrain him from acting upon his intention by praising the (expected) quality of Schrama's participation. This intervention, directed at inclusion, is clearly in line with the mission of *Climategate.nl* (question 1.3). In expressing his intention to leave the forum, Schrama refers to rules of argumentative conduct, particularly to the *ad hominem* and *ad baculum* fallacies. In his post, *Woedende Kok* uses a typical *tu quoque* attack (van Eemeren and Grootendorst 1992:111). He attempts to show a contradiction between Schrama's reproach that he is being attacked personally and his own words in engaging the skeptics (question 2.1). The editors are not involved in this discussion about discussion rules (question 2.2).

Fragment B: 17 January – 3 February 2010

This discussion line opens with an editorial by Hajo Smit commenting on the Climategate debate in the Dutch House of Representatives. Smit criticizes the GreenLeft party spokesperson, who had compared climate policy to fire insurance. Smit uses the word ‘fraud’ with respect to climate science, but in a context of probability calculation: “Is it possible to calculate the premium we must pay for the chance that climate policy is based entirely on the fraudulent practices of a small group of climate scientists?” Participants in this discussion (44 reactions) include three editors, six other people who sympathize with the editors’ orientation to the Climategate affair, one participant (Remco van Ek) who criticizes the editorial line, and two participants with neutral contributions (question 1.1). Van Ek accuses the editors of ‘misplaced rabble-rousing’. In his reaction, editor Smit refers to the initiators’ aims:

As long as donations are coming in and a broad majority of the visitors reacts enthusiastically and constructively, we surmise that we occupy a valuable niche in the media landscape. [...] You can say many things about this website, but not that we do not offer our participants much room to color situations and events in different ways. In most cases, this results in interesting discussions. I urge you to make up your mind. If this site is of value to you, please participate constructively. If not, please just move on.

Later in this discussion, Van Ek argues that his opponents fail to explicate the substantive arguments underlying their criticism of mainstream climate science. He uses the word ‘fraud’ in his reconstruction of their standpoint. In addition, Van Ek accuses the skeptics

of cherry-picking in their publicity about the hacked e-mails. Both camps ask their opponents to substantiate their claims, and each camp blames the other for evading the burden of proof. For example, in a discussion with *Jeroen*, van Ek observes:

You are unable to compile a Top 3 list that could prove the existence of purposeful scientific fraud. You are also unable to react to the clear counter-argument that climate denialists and other Climategate fans are involved in cherry-picking.

Jeroen replies as follows:

In an earlier reaction, another blogger urged you to provide evidence to support your proposition regarding ‘cherry-picking by skeptics’. Up to this point, I have seen nothing. It seems that you are engaged in a personal fight by posing questions without providing substantive reactions to the counter-questions posed by others. In legal practice (as well as in science, at least in my opinion), the rule is that ‘whoever asserts a fact must prove it’ [...]

Editor Crok intervenes with a post directed at Van Ek, which begins as follows:

Your presence here is useful, because up to this point, most of the people who have reacted have been those who agree with most of the editorials. Discussion keeps us sharp, and it might lead to adjustment of the editorial formula.

Editor Smit inserts a reaction with more irony:

Remco: [...] I'm sorry, but it seems to me that you keep falling back into Real-climate clichés.³ I haven't seen anything that is truly original. I'm still waiting. I also wonder why you are following a website 'that isn't all that serious' [van Ek's words, AE] so closely. At any rate, make yourself at home ... perhaps someday we'll hear something new and truly noteworthy from you ...

Crok continues with a reaction to van Ek's use of the word 'fraud':

Fraud is a legal term and difficult to prove. Mann [a climate scientist, AE] has substantially manipulated data with his hockey stick, but McIntyre has never called this fraud. I hope that I didn't use the term fraud in my editorials. If I did, I should delete it.

Earlier in the discussion, editor Smit also distanced himself from the use of the word 'fraud' by providing the following specific formulation of the purpose of *Climategate.nl*: "Our aim is purely to examine whether the hacked e-mails and everything that happened in the aftermath point to fraud and corruption or not." In a long reaction, van Ek explains that he sees no difference between 'substantial manipulation' and 'fraud'. He insists that the skeptics continue to deny the results of scientific research that are published in peer-

reviewed journals, and that they are engaged in a purposeful disinformation campaign. Crok finally formulates the following invitation:

I hereby invite you to write a guest blog in which you prove this. Take a skeptic (for example, Soon, McIntyre, or Michels) and make it clear which abuses are at issue and how these abuses have led to faulty knowledge. Agreed?

In this complex discussion line the discussion centers on the significance of the Climategate affair. However, the purpose and possible bias of the editorials and discussions forum are thematized as well (question 1.1). Participant van Ek and editor Smit exchange different evaluations of *Climategate.nl* (question 1.2). Implications with regard to further participation are not raised by the critic himself (as in Fragment A) but by the two initiators of *Climategate.nl* (questions 1.2 and 1.3). Crok's reaction on this issue constitutes a welcome on rational grounds ("Discussion keeps us sharp"). His reaction reflects De Koster's reconstruction of the considerations of 'concerned citizens' with regard to the participation of outsiders: an opportunity for deliberation that enables these citizens to shape their own ideas and arguments (De Koster 2010). Smit confronts van Ek with his own intentions ("make up your mind"). In spite of the critical and somewhat sarcastic undertone of Smit's reactions, they still constitute a kind of welcome, i.e. an act of inclusion, although the possibility of self-exclusion is subtly raised as well ("If this site is of value to you, please participate constructively. If not, please just move on").

With regard to research question 2.1, the core element of an argumentative community that is thematized are (again) the norms for argumentative conduct, particularly the norm which centers on the burden of proof. Van Eemeren and Grootendorst (1992) discuss the practice of evading and shifting the burden of proof as fallacies in the distribution of discussion roles. Non-mixed disputes involve questioning a particular standpoint (either positive or negative) with regard to a proposition. In contrast, mixed disputes involve questioning both a positive and a negative standpoint regarding the proposition (van Eemeren and Grootendorst 1992:17). In a non-mixed dispute, it is necessary to establish whether the protagonist is guilty of evading the burden of proof. In mixed disputes, however, the problem involves “the order in which the two parties must acquit themselves of their burden of proof” (Eemeren and Grootendorst 1992:121). The situation in this fragment is even more complicated, as it seems to represent a ‘multiple mixed dispute’, in which both a positive and a negative standpoint relating to two propositions are questioned:

- Proposition 1: Mainstream climate scientists are guilty of fraud +/p1, -/p1

- Proposition 2: Skeptics are guilty of cherry-picking and other abuses +/p2, -/p2

Although neither negative standpoint is made explicit, the context of this discussion line indicates that participants can be held to them. The situation is further complicated by the fact that both editors deny that they have endorsed the use of the word ‘fraud’ in Proposition 1. If van Ek insists upon the use of this word, he could have been held liable for the straw man fallacy. Van Eemeren and Grootendorst (1992:121) explain that the problem of the order of acquitting the burden of proof is difficult to solve: “Often, each party makes an attempt to force a decision and lay the burden of proof at the door of one

of the parties.” In my view, this occurs in the last post of this discussion line, in which Crok invites van Ek to write a guest blog in providing evidence to support Proposition 2 (question 2.2). I conclude that, as in fragment A, the thematization of further participation is inextricably linked with the thematization of norms for argumentative conduct. In this fragment, the editors are heavily involved in this process.

Fragment C: 14-21 June 2010

This discussion line opens with an editorial by Hajo Smit containing a favorable discussion of a critical paper about the IPCC. Participants in this discussion (76 reactions) include editor Smit and 13 other individuals. Several of the participants (@*anoniem* and at least three others) apparently adhere to alarmist positions in the climate debate (question 1.1). The discussion begins with a statement by Smit declaring that a reaction posted by @*anoniem* has been deleted, as it constitutes a purely personal attack. Several other participants take up for @*anoniem*, although they advise the poster to remain polite. In a later post (which was not deleted), @*anoniem* points out: “I don’t think I’m any more impolite than Hajo’s Fox News style of journalism. But, yeah, he’s the censor here...” The discussion soon shifts to the supposed bias and tone of voice in Smit’s editorials. One participant, Paul van Egmond, indicates that he is dropping out “for the time being”:

Perhaps Climategate.nl will consider my decision such a great loss that it will seize the opportunity to provide an honest and balanced picture of the climate debate.

Van Egmond is indeed a regular participant in online debates about climate change. Editor Smit acknowledges that the editorial team had not published any explicit web-etiquette policy. He also refers to the absence of Marcel Crok [who represents the more nuanced voice in the team, AE], who is busy writing a book. Finally, Smit extends challenges to write guest blogs.

An important theme in the discussion concerns the credentials of authors and spokespeople in the international climate debate, including Hulme (a critical climate scientist and one of the authors of the paper on the IPCC) and several skeptical American and Dutch bloggers. One participant distinguishes between the degree of authority (generally conferred to scientists) and the relative trustworthiness (or untrustworthiness) of bloggers and other discussants (question 1.1). Later in the discussion, *Neven* intervenes. *Neven* is a regular participant who supports the alarmist position and one of the few to accept the invitation to write a guest blog. His first guest blog was published on June 13, only one day before this discussion began. In an extensive post, *Neven* first addresses the theme concerning the credentials of spokesmen in the international climate debate. Subsequently, he goes into the orientation of *Climategate.nl* and concludes as follows:

With this website, you are clearly answering the demand in the Netherlands for a semi-neutral site where people can engage in discussion about climate and policy. [...] If you were to dream of becoming the WUWT or ClimateDepot of the Netherlands – and if you were to succeed in doing so – you would throw all of

this away.⁴ I have lately begun [...] to feel increasing regret for spending my internet time and energy reading this forum. If the alarmists are chased away, there will be nothing left but an echo chamber. [...] Instead of progressing, this site is deteriorating on this important point.

Six months after the start of *Climategate.nl*, the discussion about the quality of this online forum seems to become more intense. Editor Smit's decision to delete a post of @*anoniem* elicits a discussion in which the forum's purpose as well as norms for argumentative conduct are thematized (in particular, again, the *ad hominem fallacy*) (questions 2.1 and 2.2). This discussion about the forum's quality is also conducted against the backdrop of a discussion about the authority and trustworthiness of discussants and sources (question 2.1). *Neven* appears to be using his own position as a regular and constructive alarmist participant by blowing the whistle. In the first two sentences of his post, he thematizes the forum's purpose. He provides a critical evaluation of how *Climategate.nl* has developed in the course of time (question 1.2). The further participation of alarmists is at stake. *Neven* uses the term 'echo chamber' and refers to the fact or possibility that "the alarmists are chased away." He even seems to hint at the possibility of self-exclusion ("...feel increasing regret for spending my internet time and energy reading this forum"). One participant (van Egmont) decides to leave the forum (question 1.2). Editor Smit tries to defend himself and urges for guest blogs, which can be interpreted as a gesture of inclusion (question 1.3). Within the sample of five discussion lines, this discussion seems to constitute a turning point!

Fragment D: 18-21 April 2011

This thread opens with an editorial by Hajo Smit reporting on the weakening position of the U.S. Environmental Protection Agency, particularly with regard to the issue of a ‘green economy’. In this discussion (25 reactions), the regular visitor and alarmist *Neven* posts critical comments on Smit’s editorial. In addition to editor Smit and *Neven*, seven other visitors participate, all of whom support Smit’s argumentation (question 1.1). Smit intervenes in this discussion with a blog post expressing doubts concerning the value of entering into discussion with alarmists:

It remains very clear to me that Kuhn was absolutely right that any discussion between believers from Camp A and believers from Camp B is impossible [...]
As I’ve argued before, I do not look forward to bantering back and forth with the likes of you [...] In too many cases, we have praised you – as far as I am concerned, wrongly. The same ‘Get lost!’ with which I have personally chased others away is just as applicable to you. I’d rather see 10 good reactions from like-minded people than to waste all this energy with idiots (as seen purely subjectively from our camp) like you. I will see to it that you will behave as a guest; otherwise, I will have you blocked.

Ten months after *Neven* expressed his concerns about alarmists being chased away, he seems to become a victim himself! Other participants sympathize with Smit’s statement, but several make additional comments. *Scarface*, for instance, introduces an instrumental argument:

Types like Neven are spoiling the atmosphere on this blog. But believe me; a random visitor to this blog will be more impressed by well-supported anti-AGW [Anthropogenic Global Warming, AE] commentaries than they will be by 15 like-minded people posting over-the-top anti-AGW propositions.

Tinstaafl advances a line of argumentation that emerges regularly in debates on climate change, referring to the ideological life-style perspective:

People like Neven are clearly proving how the Green Taliban works and how life in a green eco-socialist state would be if he and his sort were to run the country. [...] It is therefore good for him to have the occasional opportunity to display his uncompromising eco-nagging.

Smit evaluates the discussions, thereby thematizing the forum's purpose by arguing that he has lost his faith in the fruitfulness of discussions with the alarmist camp (question 1.2). Subsequently, he executes a maneuver of exclusion with the statement "The same 'Get lost!' with which I have personally chased others away is just as applicable to you" which can be interpreted as an indirect directive to leave the forum (questions 1.2 and 1.3). In terms of elements of an argumentative community, this act of near-exclusion is justified by Smit and discussed by other participants in reference to the purpose of the discussions on *Climategate.nl* (questions 2.1 and 2.2).

Fragment E: 27 April – 2 May 2011

This thread opens with an editorial by Hajo Smit calling attention to a new climate blog. It presents a top-ten list of physical facts that (according to the blog's editor) provide incontrovertible evidence that global warming is occurring. Smit provides a link in which 'a complete rebuttal' of these facts is provided. The authors of this rebuttal belong to the editorial team of the skeptical website *slayingtheskydragon.com*. In this discussion (31 reactions), one participant criticizes the tone in the debate, asking, "How can any respect develop between alarmists and skeptics in this way?" (question 1.1). Editor Zeilmaker responds somewhat sarcastically by pointing out that this participant [obviously a regular visitor, AE] is making a judgment that does not align with 'the epistemic values of this blog':

We have already reached the conclusion that his presence here is not appreciated. Thus far, however, he seems incapable of reading the Dutch language. We therefore feel obliged to use expletives that do justice to the sincere emotions that his persistence is evoking among many regular visitors: take your phony good manners and piss off [in Dutch: *rot op*] [...]

However, some prominent skeptics intervene in this discussion with some criticism. Hans Erren, a Dutch geophysicist and a moderate climate skeptic, fiercely attacks the rebuttal in the following post:

Well look, I stop reading immediately when somebody presents this as a counter-argument: ‘A further illustration of the variability of atmospheric carbon dioxide can be gained from Ernst-Georg Beck’s accurate analysis covering 180 years.’

What a shame [...].

Another participant intervenes – Arthur Rörsch, a retired prominent Dutch scientist and a skeptic in the climate debate:

I feel that a bit more ‘peer review’ on this blog would be desirable as well [...].

Hajo could play devil’s advocate more often by not simply accepting every anti-AGW proclamation at face value, but instead subjecting the rebuttals to these proclamations to criticism. I think that this would make a stronger impression.

Treat criticism that arises from within your own skeptical angle with criticism as well.

In the first part of this line of discussion, editor Zeilmaker performs, and even more bluntly, the same act of exclusion that his co-editor Smit had performed one week before. Zeilmaker refers to ‘the epistemic values of this blog’, which apparently include the norm that references from critical participants regarding the appropriateness of a respectful tone in the debate are not welcome (questions 1.2 and 1.3). In the second part, topics concerning the acceptability of arguments and authority of sources crop up. Subsequently, a new perspective on the purpose of the discussions on *Climategate.nl* appears: criticism among the skeptics themselves (question 2.1).

6. Conclusion

Sunstein's balkanization thesis requires a nuanced approach. As suggested by the literature review, although some mechanisms seem to facilitate balkanization and group polarization, participants in political online forums might also have an interest in the participation of dissidents. Furthermore, the empirical findings on the homogeneity of messages are inconclusive. I drew two main conclusions. Firstly, contextualization is essential to the understanding of why homogeneity can be found in some political online forums and not (or less) in others. Secondly, a more detailed grasping of the dynamics of the argumentation process is needed in order to get a better understanding of polarization and homogenization. For this aim, I adopted a process view of virtual communities and analyzed five discussion lines on the online forum *Climategate.nl* that are distributed over a period of 17 months in 2009 and 2010.

The objective of the empirical portion of the paper is to analyze (1) which processes of participant inclusion and exclusion take place and (2) how these processes are manifested in communication between participants. To answer this second question, I used the concept of an argumentative community. In an argumentative community the purpose of discussions, the acceptability of arguments, the authority of sources and norms for argumentative conduct are continuously thematized and re-interpreted. The first conclusion that can be drawn is that even a well-intentioned forum like *Climategate.nl* seems to move in the direction of an echo chamber gradually over time. The analysis shows that *Climategate.nl* was never (completely) balkanized. However, acts of exclusion and self-exclusion did occur in the course of time. In the initial stages of the

forum, the community managers apparently tried to keep dissidents involved. In this case, one contextual factor seems to have been crucial: the initiators' aims, laid down in the mission statement, which expresses the intention to provide a platform for respectful and fruitful discussion. Fragments from a later stage, however, suggest that dissidents were chased away and that the community managers had played an active role in this. One of the editors explicitly argued that he had lost his faith in the fruitfulness of discussions with the alarmist camp. The second conclusion refers to the elements constituting an argumentative community. The purpose of the discussions has been re-interpreted over time. This is a core issue in the constitution of an argumentative community. Other elements, including the authority of sources and norms for argumentative conduct, were thematized as well. Self-exclusion and exclusion of dissidents were accompanied with meta-discussions relating to fallacies, such as the *ad hominem* and *ad baculum* fallacies and fallacies of evading and shifting the burden of proof. These fallacies exemplify the adversarial communicative culture of discussion forums on climate change. A third conclusion can be drawn, which concerns the causal structure underlying Sunstein's argument (discussed in section 2). The relationship between homogenization and group polarization involves a dynamic that works in both directions: group polarization seems to encourage homogenization, and not only the other way around. It is important to note, however, that *Climategate.nl* has retained a non-homogeneous composition. A quick overview of the threads occurring after the period included in this research reveals that new participants are continuously entering the forum. This investigation of five discussion lines does not warrant definitive conclusions.

This study reveals some implications for the design of online forums on controversial issues. One implication concerns the separation of the roles of moderator (or community management) and editor. On *Climategate.nl*, the primary editors combined these roles. The moderation of an online argumentative community, however, requires capabilities other than those required for the journalistic task of editing. In the case of *Climategate.nl*, a ‘counter-steering’ community-management style and moderation policy would be required in order to keep group polarization and homogenization within certain limits. In terms of concepts presented in Table 2, I conclude that the aims laid down in the initiators’ mission statement, were not embedded strongly enough in the moderation policy to withstand pressures from the communicative cultures involved in discussions between climate skeptics and alarmists. A counter-steering moderation policy is needed to strike a balance.

References:

Dahlberg, Lincoln. 2001. "The Internet and democratic discourse: Exploring the prospects of online deliberative forums extending the public sphere." *Information, Communication and Society* 4.1: 615-633.

Dessler, Andrew E., and Edward A. Parson. 2006/2010. *The science and politics of global climate change: A guide to the debate*. Cambridge: Cambridge University Press.

Eemeren, Frans. H. van, and Rob Grootendorst. 1992. *Argumentation, communication and fallacies: A pragma-dialectical perspective*. London/New York: Routledge.

Eemeren, Frans. H. van, Peter Houtlosser, Constanza Ihnen and Marcin Lewiński. 2010. "Contextual considerations in the evaluation of argumentation." In *Dialectics, Dialogue and Argumentation*, ed. by Chris Reed, and Christopher W. Tindale, 15-132. London: College Publications.

Eemeren, Frans. H. van . 2011. "In context: Giving contextualisation its rightful place in the study of argumentation." *Argumentation* 25:141-161.

Ereaut, Gill and Nat Segnit. 2006. *Warm Words: How are we telling the climate story and can we tell it better?* London: Institute for Public Policy Research.

Ereaut, Gill and Nat Segnit. 2007. *Warm Words II: How the climate story is evolving and the lessons we can learn for encouraging public action*. London: Institute for Public Policy Research.

Fuchs, Christian. 2006. *eParticipation research: A case study on political online debate in Austria*. ICT&S Center, Research Paper No. 1.

Garrett, R. Kelly. 2009. "Echo chambers online?: Politically motivated selective exposure among Internet news users." *Journal of Computer-Mediated Communication* 14:265-285.

Habermas, Jürgen. 1962/1989. *The structural transformation of the public sphere*. Cambridge, MA: MIT Press.

Held, David. 2006. *Models of democracy*. Cambridge: Polity Press.

Hill, Kevin A., and John E. Hughes. 1998. *Cyberpolitics: Citizen activism in the age of the internet*. Lanham: Rowman, Littlefield Publishers.

Huckfeldt, Robert and John Sprague. 1995. *Citizens, politics and social communication: information and influence in an election campaign*. Cambridge: Cambridge University Press.

Hulme, Mike. 2009. *Why we disagree about climate change: understanding controversy, inaction and opportunity*. Cambridge: Cambridge University Press.

Johnson, Thomas J., Shannon L. Bichard and Weiwu Zhang. 2009. "Communication communities or 'cyberghettos'? A path analysis model examining factors that explain selective exposure to blogs." *Journal of Computer-Mediated Communication* 15:60-82.

Kies, Raphaël. 2010. *Promises and limits of Web-deliberation*. Basingstoke: Palgrave Macmillan.

Kingdon, John. W. 1984. *Agendas, alternatives and public policies*. New York: Harper Collins College Publishers.

Kobayashi, Tetsuro and Ken'ichi Ikeda. 2009. "Selective exposure in political web browsing. Empirical verification of 'cyberbalkanization' in Japan and the USA." *Information, Communication & Society* 12.6: 929-953.

Koster, Willem. de. 2010. *'Nowhere I could talk like that': Togetherness and identity on online forums*. Ph.D. dissertation, Erasmus University Rotterdam.

Lave, Jean and Etienne Wenger. 1991. *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press.

Lewiński, Marcin. 2010. *Internet political discussion forums as an argumentative activity type. A pragma-dialectical analysis of online forms of strategic manoeuvring in reacting critically*. Ph.D. dissertation, Amsterdam University.

Malone, Elizabeth L. 2009. *Debating climate change: pathways through argument to agreement*. London: Earthscan.

McKerrow, Raymie E. 1990. "Argument communities." In *Perspectives on argumentation. Essays in honor of Wayne Brockriede*, ed. by Robert Trapp and Janice Schuetz, 27-40. Prospect Heights: Waveland Press.

Mutz, Diana C. 2002. "Cross-cutting social networks: testing democratic theory in practice." *American Political Science Review* 96.1: 111-126.

Papacharissi, Zizi. 2002. "The virtual sphere: The internet as a public sphere." *New Media & Society* 4.1: 9-27.

Schkade, David, Cass R. Sunstein and Reid Hastie. 2007. "What happened on Deliberation Day?" *California Law Review* 95: 915-940.

Sunstein, Cass R. 2001. *Republic.com*. Princeton: Princeton University Press.

Sunstein, Cass R. 2009. *Going to extremes. How like minds unite and divide*. Oxford: Oxford University Press.

Tsaliki, Liza. 2002. "Online forums and the enlargement of public space: research findings from a European project" *The Public* 9.2: 95-112.

Wilhelm, Anthony G. 2000. *Democracy in the digital age*. New York: Routledge.

Wojcieszak, Magdalena. 2010. "'Don't talk to me': effects of ideologically homogeneous online groups and politically dissimilar offline ties on extremism." *New Media & Society* 12.4: 637-655.

Wright, Scott and John Street. 2007. "Democracy, deliberation and design: The case of online discussion forums." *New Media and Society* 9.5: 849-869

Notes

The author wishes to thank Marcin Lewiński for valuable comments on the first version of this paper during the International Colloquium 'Argumentation in Political Deliberation', which was held on September 2, 2011 in Lisbon. Willem de Koster (Department of Sociology, EUR) and two anonymous reviewers gave valuable comments on an earlier version of this paper.

¹ For an overview of the stock issues in the climate change debate, see Malone (2009) and Dessler and Parson (2010).

² The hockey stick curve is a climate reconstruction that depicts the climate in the twentieth century as unusually warm in comparison to preceding centuries. The Canadian mathematician McIntyre and the economist McKittrick raised questions with regard to its validity.

³ *Realclimate.org* is a blog of climate scientists who belong to the ‘alarmist’ camp.

⁴ *WattsUpWithThat.com* and *ClimateDepot.com* are two popular skeptical websites.