Persuasion, Facilitation… Contestation?

– Conceptions of Climate Change Communication in Recent Literature

August Lindemer

Persuasion, Facilitation… Contestation?
- Conceptions of Climate Change Communication in Recent Literature

August Lindemer

Abstract

The causes and consequences of climate change are to varying degrees understood, produced and faced by various societies across the planet. The projected scope of its consequences and the underdetermination thereof causes much public contestation. Scholars of climate change communication express various positions towards the nature of the issue and the purpose of science communicative efforts. Through a literature review of research articles on climate change communication published between 2010 and 2018, I show that top-down approaches to communication based on psychological considerations are frequently argued to provide the necessary response to public uncertainty and disagreement on the issue. Linking these, and other, positions to epistemological and political considerations, I offer a liberal democratic critique of this conception of climate change communication as both ideologically and pragmatically questionable.

Table of Contents

1. Introduction

This research set out with the aim of analysing how various conceptions of climate change communication relate to positions on the desirability of a pervasive consensus on or contestation of the issue of climate change. Scientific consensus and the communication thereof to the public, presumed to be the progenitor of the end of the climate change debate, has done anything but lay the public contestation of the issue to rest (Pearce, et al., 2017). Inspired by pluralist thinkers (Rescher, 1993; Mouffe, 2013) and previous research (Pepermans & Maeseele, 2016), the aim of this thesis is to analyse and critique the interrelation of epistemological, methodological, and political positions towards climate change communication found in contemporary scientific literature.

This thesis is written in the firm belief that the ways in which the issue of anthropogenic climate change and the communication pertaining to it is conceived and discussed in the scientific literature is relevant, carries responsibility, and has impact on human affairs that take place outside of it. This is inarguably the case when this literature is articulating strategies for communication efforts directed at affecting those who are involved in the activities that are subjected and give rise to the consequences that follow from climate change. Problematic conceptions of climate change communication are hereby believed to carry with them the risk of detrimental ramifications for the societies affected by it and the political processes involved in their governance. If one, prima facie, takes objection to aspects of the perspectives expressed in this scientific literature, it promises a fruitful undertaking to thoroughly evaluate these conceptions and the arguments they present. This is what I am doing through the research presented in this thesis. The impetus is thus two-fold. First, to acquire a thorough understanding of the perspectives expressed in the existing literature on climate change communication and to properly account for the arguments presented by it. Second, to offer, if applicable, a critique of these perspectives.

Several research questions have been posited to guide the process from the identification of the relevant literature, to the analysis of its perspectives and arguments, to ultimately the development of a critique to these. The questions guiding this thesis are as follows:

– How do different articles within contemporary scientific literature conceive of the function and role of climate change communication as a practice, its purpose as a research endeavour, and how do these conceptions relate to larger questions about epistemology and political processes?

– Which aspects of the conceptions of climate change communication pervade throughout the literature, and which are scarcely found?

– What positions expressed in the literature can be grouped into more or less coherent categories, what are their categorical characteristics, and how do these categories differ from each other?

– What are the potential issues emerging from the expressed positions towards climate change communication, in particular the social and political consequences of the discourses they propagate?

The first three of the four questions are rather operational in that the reason of pursuing them derives from the insights they provide for answering the fourth one. It is this latter question that posits the larger purpose of this research, namely to develop a critique towards the found positions. My aim thereby is to rearticulate the need for researchers to reflect on their contributions to the social construction of climate change and society at large. In what follow I will briefly introduce the topic of discussion by sketching the background of climate change.

1.1 The Issue of Climate Change

Climate change, in the broadest understanding, denotes a shift in the distribution of weather patterns in variously sized contexts, such as the hemispherical transitions in and out of glacial periods or the onset of climatic anomalies such as the Medieval Warm Period in the North Atlantic. The understanding of the term that I am employing in this thesis is more accurately described as anthropogenic climate change, frequently also referred to as global warming. Article 1, paragraph 2 of the United Nations Framework Convention on Climate Change defines climate change in accordance with this understanding as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere" (United Nations, 1992).

The idea that human activity can, at least in local contexts, change climatic conditions can already be found in writings from classical antiquity, with writers such as Theophrastus describing the climatic cooling of Larissa, Greece, in the wake of extensive drainage of local swamps (Neumann, 1985). That humans may in fact impact the climate at a global scale emerged as a scientific theory during the late 19th and early 20th century, leading to the longitudinal studies of atmospheric carbon dioxide concentrations by American scientist Charles David Keeling. Keeling's research culminated in one of the most famous graphical depictions of climate science, the eponymous Keeling Curve (Hulme, 2009, pp. 54-56). This concern for atmospheric concentration of certain so-called greenhouse gasses (GHG) is explicitly named in the aforementioned climate change definition of the UNFCCC, and has become the cornerstone of climate science. Much of the leading research conducted in line with the Intergovernmental Panel on Climate Change (IPCC) builds on the analysis of cumulative anthropogenic GHG emissions (IPCC, 2014, p. 8). The effect of this change

in the composition of atmospheric gasses is, chiefly, an increase of global mean surface temperature that has been varyingly extrapolated with the help of scenario projections. These attempt to account for the different possibilities of physical and socio-economic developments and climate policy initiatives.

The baseline scenarios of the most recent IPCC report, meaning those scenarios that assume no additional efforts to constrain emissions, project the increase of global mean surface temperature to be anywhere between 1.4°C and 4.8°C compared to that around the turn of the 3rd millennium (IPCC, 2014, p. 10). The contingency of the predictions of climate change's consequences does, of course, not stop here. It is on the basis of these varying scenarios that a range of potential effects on a wide variety of meteorological, hydrological, and geological processes are predicted to take place. Examples for this are sea level rise due to glacial melting, the thermal expansion of oceans, and the increase in frequency of extreme weather events. What ramifications these physical changes have and will have on human societies, and how these consequences are faced differently by different regions, social groups or individual people, adds yet another level of contingency. That the different projections trying to account for these contingencies are widely diverging, even when they only account for a limited set of potential scenarios such as the baseline, raises the pervasive issue of underdetermination that underlies much of the discussion within this thesis.

Due to the uncertainties in the available scientific knowledge of climate change, in particular in regard to its potential consequences, climate change is not ultimately scientifically determined. In addition to the uncertainty of climate change's potential consequences, they are to the best of the available knowledge projected to have global scope, be in many ways irreversible, and may have far-reaching and devastating effects on social and ecological systems. Because of these extraordinarily high stakes paired with a certain level of indeterminableness the issue is subsumed under what has been termed post-normal science (Hulme, 2009, pp. 78-79). In contrast to regular applied science and its commitment to neutral disinterestedness, post-normal science operates with high-risk, uncertain, and value-invested issues that require communicative efforts not just to bring public attention to these risks and uncertainties but to establish urgently needed, or so perceived, decisions. In this light climate change communication emerged as a practice deemed necessary by physical scientists and environmentalists to disseminate their insights and concerns to a larger audience (Moser, 2010, p. 33). It is in this context that climate change in its physical dimension has become inextricably linked with the communicative efforts and practices surrounding it. As I will mention in section 2.1 and later show through my analysis, these origins of climate change communication as a directed effort and means for awareness raising and information dissemination continue to have severe implications for the approaches taken towards it.

1.2 Scope and Positioning

This thesis takes several positions in and directions towards the scope of its research, some of which I want to name explicitly here. First, this research rests on an epistemological commitment to social constructionism and contextualism. In its social constructionist positioning, it builds on the assumption that what people know of the world rests, ultimately, on shared social understandings of physical reality— understandings which are not a mere perceptive derivation but socially constructed ones (Burr, 2003, p. 6). This means, as a consequence, that the impartial materiality of a change in meteorological conditions is subordinated in its social significance to the imparted meaning of climate change. What people think of climate change both directs their actions to a greater degree and carries greater social consequences than its objective physicality does, and does itself reinforce what others think of it in turn. This circumstance puts significant weight on the approaches to and modes of communication surrounding the issue. It is through communication between people that the meaning of climate change is shared and imparted.

Further, the contextualist position taken in this thesis asserts that different individuals have, given their differently situated contexts and the contingent experiences provided by these, epistemically justifiable divergent preferences (Rescher, 1993, p. 114). This means, concretely, that different people have justifiable different understandings of climate change. Not only does this result in equally different positions towards the communication surrounding the issue, but it means that the process of communication itself cannot be assumed to be have an ideal form or content that qualifies for a unified, top-down process of how and what to communicate. To avoid confusion on this point, this position does not rest on a radical epistemological relativism that considers each and any approach to reasoning as equally valid, but derives from the experiential conditions and limitations under which this reasoning is conducted. It is in this light that I will employ the term perspective to refer to the distinct experiential positions on whose grounds understandings are formed, meanings are given and, particularly in the case of communication research, arguments are built.

Lastly, when I discuss politics I am doing so in reference to political processes and conditions in the context of liberal democratic systems. Consequently, any discussion of societies, publics, or citizens refer to the societies and citizens of the aforementioned liberal democratic contexts. One may rightly argue that this results in a construction of a representative ideal, a placeholder standing in for all potential concrete contexts to which the analysis may be applied. Such a construction is however, apart from being a methodologically desirable delineation for the analysis of an international body of literature, necessary to coalesce a variation of individual studies into coherent perspectives representative of their unified conceptions of the political, scientific, and communicative processes concerned with, most significantly, the global and context

transcending phenomenon of climate change. Ultimately, the limitation emerges out of the fact that the literature here analysed is written and published, with few exceptions, in liberal democratic countries of Europe and North America covering research on the cultural, social, and political systems of these regions.

2. Theoretical Considerations

Several aspects need to be considered that connect the issue of climate change to concerns of communication and other socio-political dimensions. In the following two subchapters I will discuss a number of definitional questions and theoretical considerations that explicate conceptions of climate change, communication, politics, and their relation to each other.

2.1 Why Communicate Climate Change?

In its broadest sense, one can call any communication concerning climate change, be it among researchers inquiring into the issue or political committees discussing the possible actions taken in response to it, climate change communication. In the literature on the topic however, the term climate change communication is commonly used to more narrowly refer to a form of strategic communication *of* climate change (Schafer, 2012; Pidgeon & Fischhof, 2011). Recalling the earlier mentioned impetus behind much of the discussions surrounding climate change communication as a necessary effort to tackle a high-risk issue, these notions of strategically communicating climate change rather than communicating *about it* may not be all too surprising, not to say any less problematic.

Nerlich, Koteyko and Brown (2010) describe the inquiry into this so understood issue of climate change communication as the examination of:

> the role of communication in perceptions of climate change, […] the effectiveness of different tools in raising awareness and understanding of climate change […] (and) the barriers that may hinder […] subsequent motivation to act on these messages (p.97).

Two striking notions of communication emerge from this understanding. First, that climate change communication ought to function as an effective tool through which some epistemic superior, someone aware and understanding of climate change, can disseminate knowledge to the uninformed to raise their level of awareness to his or her own. Second, that based on this disseminated knowledge the now enlightened ought to act according to the information they were given, and would do so were it not for some form of action-hindering barrier.

These hierarchical understandings of communication relate strongly to two established areas of strategic communication studies, namely risk and change communication. The risk communicative perspective, which originates in crisis and emergency

management, sees communication in the role to inform, prepare and alleviate (Reynolds & Seeger, 2005). The receivers of what may accordingly be called climate risk communication ought to be informed on the risks they face, assisted in their preparations to face them, with the ultimate goal of preventing future detrimental effects. Meanwhile the perspective of change communication, originating in organizational management, is concerned with enticing behavioural changes, guiding actions, and managing the potential resistances to these desired adaptions (Elving, 2005). In the context of climate change, these change communicative approaches aim for example at facilitating the acceptance of regulations or the engagement in low carbon lifestyles (Ockwell, et al., 2009). In both cases, the strategic element of communication is found in its attempt to disseminate information or induce action. To be sure, there are contemporary voices arguing against a simple top-down conception of risk and change communication, advocating instead for dialogue over dissemination and the integration of community-based knowledge (e.g. Genilo, 2018).

This understanding of climate change communication is further related to a more general theoretical conception of communication that, in many ways, is at its basis, namely the transmission model of communication, a variation of which is also known as the Shannon-Weaver model after the two American mathematicians that popularized it in the late 1940s (Craig, 1999, p. 122). In the transmission model, communication is conceived as the unidirectional process of information transfer, in which a source neutrally transmits an item of information that, after being subjected to potential interference, is received and reconstructed at its destination. This kind of unidirectionality may well account for the strategic communicational approaches sketched above. Interestingly, approaches that employ an understanding of climate change communication along the abovementioned lines are often theoretically averse to the transmission model of communication and rather explicit in their rejection of its claims over the simple transferability of neutral information (e.g. Kahan, 2010). Arguments for the use of what are in essence information transmission strategies can be found pre- and succeeded by expressions of scepticism over the ability of the transmission model to capture the breadth of communicative processes. In the operational approaches to communication they advocate then, they continue to follow much of the same arguments, with some of the major differences being that the sender has to find ways to account for, avert or rectify various culturally subjective, normative and cognitive distortions on the receiver's part. The concerns so expressed thus seem to be directed at specific iterations of the model rather than its essential premises.

2.2 Why Contest Climate Change?

To begin the discussion of why climate change represent a topic of political contestation, I want to first clarify a number of concepts. The context this study

considers for its discussion of political processes is, as mentioned in the introduction, that of liberal democratic systems. Political systems are considered liberal and democratic to the degree to which they sustain and guarantee the rights to democratic rule, i.e. the institution of an accountable government that is formed through direct participation or representation by and of its general population, and political liberties, i.e. the ability to express political positions and advocacy e.g. through forms of media or formation of and participation in political groups (Bollen & Paxton, 2000, pp. 59-60). Politics are thus, broadly speaking, both the processes of decision making through the exertion of this democratic rule, and the expressions and advocacies of positions towards these decisions on the basis of political liberties. Due to their grounding in enacted rights, politics are instantiated practices that take place in concrete moments of human coordination (Mouffe, 2013, p. 2).

Politics are here not to be confused with my use of the conceptual term the political. With the political I am referring to the underlying condition of contestability within the abovementioned processes of decision making and advocacy—the "ineradicable dimension of antagonism" (Mouffe, 2008). To reiterate, the form of contestation seen as ineradicable by the political takes place within the context of and channels provided by the abovementioned political liberties – it is a contestation of positions taken within liberal democratic rule, not of democratic rule itself. This is to say that the concept of the political is under no illusion that decision making processes or political advocacy are (beyond the purely epistemic level) contestable in all contexts, e.g. should liberal democratic processes be terminated through state violence. It is further not a distinct form of liberal democratic politics, but a condition and characteristic of them. The political is a postfoundationalist conception that acknowledges the pervasive potential for dissensus and political conflict in the ever-underdetermined world we inhabit, and is as such as much an epistemic concept and argument as it is a political one (Winter, 2013, p. 131). It is important to point out that in its conditioning of political contestation the political is not merely an inevitable side-effect but the precondition of liberal democratic processes. It is the crucible of democratic rule and political liberties, both of which would cease to exist or in any case transform into perfect echo chambers should the contestability of positions yield to a permanent consensus (Phillips & Jorgensen, 2002, p. 187). To be sure, this is not to say that a consensus on any specific issue is a threat to the democratic system in which it emerged, nor that all positions on consensus envision it as permanent and all-pervasive. In any case however, the political rejects the idea that contestation can ever become obsolete or unfeasible within a liberal democracy and the political liberties on which it rests.

The concept of the political is of great importance for two reasons. First, it offers an inherent connection between the epistemological considerations and the political consequences that emerge from them. Second, because both the epistemic claim that

it posits, namely that issues are inevitably underdetermined, and its political conclusion, that political conflict over these issues is ineradicable, relate squarely to the here discussed issues of the social construction of climate change and its political contestation. As such, it aligns with and strengthens both the contextualist argument made at the onset of this thesis and the notion of the underdetermination of climate change. In these dimensions, the communication of climate change relates to the political in two ways. First, the approaches taken towards and advocated for climate change communication are themselves subjected to the same possibility of contestation as climate change itself is. Second, in their expression of the underlying assumptions of the determination of climate change and the function of its communication, the literature on climate change communication exposits within these assumptions its positions towards the political, i.e. the legitimate contestability of climate change and its communication.

In its commitment to an inevitability of dissensus, the concept of the political is of course diametrically opposed to the notions of a pervasive consensus regarding climate change that, as I mentioned in the introduction, are commonly posited as the desiderata of the climate debate. The quest for consensual agreement concerning climate change is however more than merely incompatible with or considered futile by the concept of the political. In so far as the quest for consensus is dismissive of the political and aims at the delegitimisation of climate change as a contestable issue fit for a warranted plurality of conflicting opinions and legitimate subjection to contentious political debate, it actively subverts liberal democratic processes (Laclau & Mouffe, 2001, p. 173). These efforts can, to be sure, itself engage in political advocacy and argue for their preferred political decisions. As I will show in the upcoming analysis however, the notions of consensus discussed by many of these positions extend well beyond a contentious, democratically posed argument for agreement.

There are, of course, more specific and issue directed arguments for the consideration of climate change as a contestable political issue that go beyond the postfoundationalist contestability of all political advocacies and, even more broadly, epistemic claims. While the historical concerns for local climates mentioned earlier are far from what is considered the global issue of anthropogenic climate change today, they already capture an essential aspect of the phenomenon that is cause for much of its controversy: its generation by some form of resource extraction or consumption. From German climatologist Eduard Brückner arguing to the Prussian House of Representatives to reduce deforestation in order to maintain climatic conditions in the late 19th century (Storch & Stehr, 2006), to calls for substantial reductions of fossil fuel consumption in the IPCC's Fifth Assessment Report (IPCC, 2014, p. 110), the countervailing measures to climate change, in particular those of mitigation, are usually connected to some form of reduction of economic activity. In a limited world with

shared resources, the conflicts of interest emerging from this juxtaposition are concerned with mutually-binding decisions made by the public, i.e. the general population of a certain polity, of which those who hold the interests are part. As people are constrained either by the limitation of their consumption or by the absence of the so-consumed resources and its consequences, these varying interests will find themselves equally justified in their contextually contingent position.

Further, the causes, social constructions and consequences of climate change are to varying degrees understood by, found in, and faced by various societies across the planet. Since we are dealing with equally varying degrees of uncertainty, causation, and imperilment make the issue fundamentally and inevitably a political one. Fundamentally so, as it relates to causes, effects and responses that exceed the individual, and as such relate to the very core of the political process of making and coordinating decisions of and for groups of people. Inevitably so, as the variation in understanding, causation, and affectedness carries with it differences in interest and conviction that will continue to exist even in societies of epistemic ideal in which absolute knowledge of the issue is available and every member possesses the same amount of information. In any case, we neither have absolute knowledge of climate change nor live in societies in which the knowledge that has been secured is available equally to everyone. How any particular society ought to ultimately act in its response is an inherently value-invested question that is contingent not just on their particular context and relation to climate change, but on what is considered desirable and what world people envision to live in. These questions cannot be answered uniformly by some final scientific comprehension of what climate change is.

3. Methodology

In line with the research impetus of critically analysing and expositing the perspectives expressed in the existing literature on climate change communication, this research takes the form of a qualitative literature review and critique. It will build on an analysis of peer-reviewed social scientific research literature on climate change communication published in scientific journals that are abstracted in the Scopus database.

The choice to conduct a literature review has several reasons and implications. First, as I am interested in the ways in which communication is conceptualized and argued to be approached in the scientific discourse surrounding climate change, it stands to reason to use one of the primary fora where such discourse is instantiated, i.e. produced and reproduced, namely research articles. With discourses I here refer to the modes by which people express aspects of reality and on the basis of expressions to and by others perceive and construct these aspects. The focus is however not on the research results reported on as such, but the ensuing discussions and conclusions drawn from them and the assumptions on which the research is built. This is to say that

I am not aiming to cumulatively synthesize the research findings as they are presented in the analysed literature, but to critically analyze the questions the literature choses to posit, the approaches taken towards answering them, their underlying assumptions, and the conclusions and recommendations drawn from them. The premise here is—to once more draw on the epistemological position of this thesis which I have by now expressed in many terms such as postfoundationalist, constructionist or contextualist— that empirical research results can and have to be interpreted and are so in various ways, and as such reveal only partially, and subordinately, the argumentative thrust of a particular study. Second, research articles are a readily available and secure source of scientific discussion, and as such present research objects that are easily accessible to both me and, if applicable, a reader who may wish to review my, equally interpretive, reading of them. The limitation to research articles is a further attempt to unify the medium of the discussions as to make a grouping of perspectives within them a more feasible undertaking. The assumption underlying this approach is that the exposited perspectives represent elements of the scientific and political discourses about, in particular, climate change and communication that exist within, through, and outside of the here analysed articles. These discourses exist through and within the articles as the literature itself, as mentioned earlier, produces and reproduces them. They also exist outside of the literature, both in that the literature is implicated by and itself implicates discourses existing throughout other media and fora for expression. In their active production and reproduction through expressions, discourses draw on each other and are themselves subjected to a condition of contingency that, similar to that of the political in the realm of liberal democracies, allows for their contestation. It is in this light then that the critique presented in this thesis can be understood as engaging in the discursive struggle over how the issues surrounding climate change communication are expressed and constructed.

One reservation has to be made explicit here. What I am discussing and at times critiquing in this thesis are the perspectives of authors as they are expressed in the articles. Since there is no possibility of further explication by the authors of their position, I want to reserve any claim towards the authors' personal or otherwise professionally expressed views on the subject. When I thus speak of a perspective of or in the literature, even when I out of written expression speak of an author's perspective, I am referring to the imparted perspective as I analyse it in the written text.

As mentioned, the Scopus abstract and citation database is used for the identification of articles to use in the analysis. The reasoning for this is solely based on the fact that Scopus is the largest database of such sort and thus allows for the most inclusive search within the existing literature (Elsevier, 2018). The candidate articles were identified first by a Boolean keyword search, and then ordered by relevance according to the number of article citations. I limited the search to abstract, titles, and keywords of

articles published during or after 2010, the year the IPCC began work on its Fifth Assessment Report. The purpose of a restriction of timeframe is two-fold. First, it ensures that the analysed articles are contemporary and relevant to the ongoing scientific discussion. Second, given my selection criterion of citation numbers, the inclusion of vastly older articles further exacerbates the degree to which the amount of citation rests on the article age and thus the amount of literature published since that could potentially cite the article in question, rather than its ongoing reception by the scientific community.

For the article database query it was necessary to decide on some definitional basis of climate change communication. Employing the earlier discussed definition in its entire depth is problematic in this regard. While a narrow definition is useful for expressing the various particularities of a concept, using it for databank search queries significantly increases the risk of excluding viable candidate articles from the empirical data due to their mismatch with the employed definition. A definition that in turn is too broad is equally problematic, as it produces work intensive data pollution by including candidate articles that are unrelated to the research. I thus decided to use a broadly inclusive but epistemologically positioned definition that provides itself no normativity or criteria of purpose and avoids a distorting pre-selection in the resulting overview. By such approach, climate change communication was defined as the communicative processes involved in the social construction of climate change and its endowment with meaning and significance. The implicit social constructionist perspective in this definition is to position it epistemologically and to ensure a modicum of exclusionary criterion as to what type of literature is to be included in the analysis, i.e. social scientific literature.

Building on this definition of climate change communication I developed several keyword matrices and abstract screened the resulting articles. I found that splitting the keyword of climate change (and similar terms) from that of communication (and, again, similar terms) resulted in roughly half of the articles being unrelated, discussing in turn issues such as bird migration patterns, health inequity, or various analyses of geophysical processes related to climate change. I ultimately decided to split the keyword matrix into two columns, one for the various expressions of climate change communication and one for

climate change communication	underst*
climate communication	perce*
climate science communication	mean*
global warming communication	skeptic* OR sceptic*
environmental communication	social* construct*
communicating climate change	
communicating global warming	

the aspects of social construction.

The cells within each column were connected with OR operators, the two columns itself with AND operators.[1]

The search returned a total of 315 articles. Aiming for a total of twenty articles to analyse, the most cited results were first abstract-screened and then skim-read one by one to filter out any articles that did not discuss the issue of climate change communication to a degree that allowed for an analysis of the perspectives taken towards or approaches advocated for in it. Of the twenty most cited articles four had to be excluded on the basis of this content criterion. One additional article by Wibeck (2014) was excluded on the basis of its methodology. Wibeck's study of research literature on climate change communication published between 2000 and 2011 is, as a literature review on the same topic, very close to my own research. While the difference in the time-frame analysed meant that Wibeck's study built on different data, I decided that a review of a review is not conducive to my intended analysis. Wibeck's study ultimately was able to contribute more as a resource of inspiration and demarcation for this thesis than it would have as one of many articles in the analysis. The five so excluded articles resulted in the inclusion of the twenty-first to twenty-fifth most cited articles.

As mentioned in the introduction, I am looking to analyse the epistemological, methodological, and political positions towards climate change communication and, where applicable, the interrelation between them. To guide the analysis of the articles, the following questions provided the focus of my reading:

– What is the impetus for, approach to, and intended contribution of the research?

– How is the issue of climate change posited and problematized?

– What is conceived to be communicated, how, and by whom?

– For what purpose is it conceived to be communicated?

– What are the conceived problems of this communication?

4. Analysis

Within the selected twenty articles, I found three distinct perspectives that allowed themselves to be grouped by consistent characteristics. While individual articles within each of the three groups differ as to the extend or severity of the ascribed positions, the group characteristics I will lay out in Table 1 to Table 3 give an overview of the various pervasive notions found within them. I named the three perspectives according to their

---

[1] Resulting in the search string: (TITLE-ABS-KEY (("climate change communication" OR "climate communication" OR "climate science communication" OR "global warming communication" OR "environmental communication" OR "communicating climate change" OR "communicating global warming")) AND TITLE-ABS-KEY (("underst*" OR "perce*" OR "mean*" OR ("skeptic*" OR "sceptic*") OR "social* construct*"))) AND DOCTYPE (ar) AND PUBYEAR > 2009

conception of the function and purpose of climate change communication respectively as persuasion, critique, and facilitation. Positions across the three perspectives range from arguing for a unilateral, top-down, persuasion of people through strategically customized and targeted communication to more participatory, bottom-up processes, arguing for integrative and multilateral engagement and inclusion of citizens.

Of the twenty analysed articles, thirteen were categorised as persuasion, four as critique, and three as facilitation. Given the small sample size, the directed query (pertaining to social constructionism), the limitation to one databank (Scopus), and the biased sampling method (number of citations), one cannot draw any conclusion as to the frequency of such perspectives in the larger climate change communication literature. A control query leaving out any keywords of the 2nd column of the keyword matrix pertaining to social constructionism revealed however, that the majority (16 out of 20) of the most cited articles would remain the same whether one includes social constructionist keywords or not. It thus not clear to what extend the sample here analysed diverges from generally well received articles within the literature.

Each of the three perspectives is introduced with a tabular overview, followed by a more detailed discussion. All three columns contain both descriptive and analytical elements. The first column presents the conceptions of what climate change communication is, what it is used for, and why it is researched. The second column describes the various problems and issues that are conceived to pertain to climate change and its communication. The third column on the political describes the conceptions of dissensus, social construction, and scientific knowledge.

4.1 Persuasion

Table 1. Perspective I: Persuasion

Articles	Perspective on CCC as a Practice and Research	Perspective on why CCC is of Concern	Perspective on the Political

Manzo; Lee et al.; Nursey-Bray et al.; Zia and Todd; Scannel and Gifford; Stoknes; Spence and Pidgeon; Kronrod, Grinstein and Wathieu; Sterman; Poortinga et al.; Cox; Howell; Schweizer, Davis and Thompson.	CCC is discussed and advocated as a strategic communication effort by experts, risk communicators and organizations with the purpose to disseminate knowledge, alter attitudes, ensure compliance with policies, and induce behavioural changes. The purpose of researching CCC is to advance scientific understanding of the effects of specific communication strategies, such as emotional and spatial appeals, framing or use of assertive language, the contexts in which they can be most effectively employed, and the structure and impact of people's mental models.	There are gaps between attitude and behaviour and between scientific and public understanding, thus both education and persuasion are required to produce desired climate change action. CCC is a tool needed to close these gaps. A range of conditions complicate this communication, such as: psychological distance to the issue of climate change, lack of awareness, individual and political ideologies, ignorance, complacency, unwillingness, biases and other cognitive barriers.	Dissensus is discussed as the result of biases and ignorance. The politicization of climate change can be overcome with strategic education and persuasion. Social constructions, values, and worldviews are of concern in so far as they influence the effectiveness of communication strategies and the acceptance and compliance with policies. Scientific knowledge is argued to be the objective basis on which to make policy decisions.

Most of the literature in this perspective is methodologically grounded in social psychology and guided by psychological investigations into the cognitive processes of individuals and groups. Many authors eschew a cognitivist stance that attempts to pry into the black boxes of people's minds, and instead focus on the social and environmental conditions that produce barriers to the acceptance of communicated information (Nursey-Bray, et al., 2012; Scannell & Gifford, 2013; Stoknes, 2014; Schweizer, et al., 2013; Lee, et al., 2015; Manzo, 2010). Here, one can distinguish between two foci. The first is primarily concerned with various forms of "cultural and individual biases" (Nursey-Bray, et al., 2012, p. 754), such as general socio-demographics (Lee, et al., 2015), identities (Stoknes, 2014), or attachments (Scannell & Gifford, 2013), and as such sees the barriers of communication lying foremost with the audiences addressed. The second, far from ignorant of the former, looks more closely into the problems of communicating a global issue with "invisible risks" (Manzo, 2010, p. 197) such as climate change in "salient and tangible messages" (Schweizer, et al., 2013, p. 59), and as such sees the communicative barriers to be an aspect of the issue itself and the limitations to its presentability. In both foci, however, climate change communication is the strategic approach to overcome these barriers.

Other authors do not refrain from ascribing the issues that climate change communication faces in making the public accept scientific knowledge and comply with policies to more general, trans-contextual psychological characteristics of people (Kronrod, et al., 2012; Sterman, 2011; Spence & Pidgeon, 2010; Howell, 2011; Zia & Todd, 2010). Kronrod et al. (2012) for example caution, that the use of assertive language in communicative approaches may conflict with and in fact trigger people's "drive for freedom" (p. 95), a drive that when not circumvented not only hinders the possibilities of persuading them to act but may in fact result in heightened resistance.

Elsewhere, authors argue that people's emotive responses to communication, such as fear, have to be utilized meticulously and treated as both a resource and a constrain depending on the specific characteristics of the communicated issue and its relation to the respective audience (Spence & Pidgeon, 2010, p. 658; Howell, 2011, p. 178). Sterman (2011) goes further and argues that people in general are limited in their mental abilities to flawed and entrenched mental models that lead to "pervasive errors and biases in judgment and decision making" (p. 813). These flaws, in turn, produce the pervasive gaps between scientific and public understanding of climate change and have to, accordingly, "be remedied" (ibid., p. 811). Zia & Todd (2010) share Sterman's concern for these mental flaws and limitations. The danger that lies in uncorrected mental models, they argue, is that they produce conflicts with scientific knowledge and resistances to science based policy measures, which in turn undermines "effective levels of participation in mitigation practices" (Zia & Todd, 2010, p. 747).

In terms of epistemological positioning and the political, the literature in this perspective uniformly places the scientific knowledge of climate change and the consensus within the scientific community regarding that knowledge at the centre of its premises. Of the thirteen articles, twelve explicitly discuss scientific consensus on the outset of their argument through direct reference to the IPCC or with other expressions such as "strong scientific consensus" (Sterman, 2011, p. 811), "almost universal consensus in the scientific community" (Poortinga, et al., 2011, p. 1017), "scientific agreement" (Evans, et al., 2014, p. 71) or "widespread scientific conclusion" (Lee, et al., 2015, p. 1014). This level of scientific consensus is commonly put into contrast with a comparatively lower level of public agreement, which in turn is variously problematized as gaps of communication (Nursey-Bray, et al., 2012, p. 755), trust (Zia & Todd, 2010, p. 745), understanding (Sterman, 2011, p. 812), attention (Schweizer, et al., 2013, p. 44), or concern (Scannell & Gifford, 2013, p. 62). A public dissensus regarding climate change is thus one produced by the aforementioned biases and various forms of gaps between what people do know and think and what they ought to know and think about the issue.

Stoknes (2014) goes as far as to dedicate his article to the issue of, what he calls, the "climate paradox" (p. 161) – namely, that an increase of scientific agreement and understanding has coincided with a decline in perceived importance by the public. Stoknes is, however, clear in that the issue for him is ultimately not whether or not citizens know or care about climate change, let alone contribute themselves with some form of knowledge or initiative. "The needed technological solutions, documented best practices and economic resources" (Stoknes, 2014, p. 168) are, so Stoknes, already defined and in most cases accessible. The challenge that remains is that of getting "a majority of citizens in each democracy to support policies for implementing" (ibid.) these solutions. He calls this approach of shifting from information dissemination in the

hope of influencing behaviour to strategies directly targeting the latter a "radical rethinking of climate communication" (ibid.).

Sterman (2011) expresses similar concerns regarding the potentially debilitating effects that the public may have on effective implementation of policy measures. In line with his abovementioned concern for various mental inabilities of people, he worries that people's involvement in policy implementation may bottleneck science from playing its "appropriate role in climate policy" (Sterman, 2011, p. 811). People are, Sterman argues, generally bad at knowing things, due to a lack of scientific literacy (p. 815), and bad at deciding things, due to poor inquiry skills (p. 816). Dissensus within a democratic system is accordingly problematic because it is caused either "inadvertently by people without knowledge of the science" (ibid., p. 812), i.e. due to their inability to know, or it is "injected deliberately by ideologues and vested interests" (ibid.), i.e. due to their inability to decide what to belief. While climate policies should, so Sterman, be based on scientific knowledge, democracies are faced with the fact that "beliefs of the public, not only those of experts, affect government policy" (ibid.), and thus run the risk of having the most thorough policy assessments go to waste if not worse.

The idea that a disagreement between, effectively, anyone, be it within science (in light of the import given to scientific agreement), between science and the public (representative of various dysfunctional gaps between the two) or between different members of the public (due to individually divergent biases and ideologies), is an in any case unproductive hindrance pervades the literature in this perspective. More than that however, disagreements, in particular between the public on the one and the scientific community or positions espoused by it on the other hand, are the essential issue that climate change communication is conceived to amend. The respective objectives of these amendments are differently perceived and include, in light of the portrayal above, the inducement of behavioural change (Howell, 2011; Spence & Pidgeon, 2010), the raising of awareness and knowledge (Nursey-Bray, et al., 2012; Lee, et al., 2015; Manzo, 2010), engagement (Poortinga, et al., 2011; Schweizer, et al., 2013; Scannell & Gifford, 2013), mobilization (Cox, 2010), and policy compliance (Sterman, 2011; Stoknes, 2014; Kronrod, et al., 2012; Zia & Todd, 2010).

It is generally noteworthy that despite various conceptions of what form of communicative effort climate change communication represents, be it public campaigning (Cox, 2010), risk communication (Lee, et al., 2015; Spence & Pidgeon, 2010), management (Nursey-Bray, et al., 2012), marketing (Kronrod, et al., 2012), or education (Lee, et al., 2015), the universal position is that it is a unilateral, top-down directed, targeted effort to disseminate specific sets of information or appeals to produce specific sets of attitudes and opinions for the purpose of inducing specific sets of actions. What is being aimed for is ultimately, and irrespective of these differences, agreement—whether it is on knowledge, priorities, concerns, policies, or actions.

These agreeable, desired ideas and actions are designed on the basis of scientific knowledge, and if communicated and disseminated effectively, they are assumed to ultimately produce a consensus in the public that mirrors the consensus reached in the scientific community. The underlying impetus of perspective I, persuasion, can be summarized with a research question posited by Zia and Todd (2010) in the conclusion of their article:

> How long do citizens remain committed to their religious and/or political ideologies after scientific messages are tailored to unravel unscientific beliefs of citizens (p. 759).

4.2 Critique

Table 2. Perspective II: Critique

Articles	Perspective on CCC as a Practice and Research	Perspective on why CCC is of Concern	Perspective on the Political
O'Neill et al.; Jaspal and Nerlich; Hansen; Brewer and Ley.	CCC is critically analysed as a communication effort by variously interested claim-makers and media outlets, who on the basis of their interests and in conflict with other interests exert political influence on the interpretation and sense making of consumers regarding the issue of climate change. The purpose of researching CCC is to develop an understanding of how various representations of climate change in media outlets compete with each other over trust and credibility in public discourses, how these influence the beliefs of their audience, and how they relate to issues of power and trust.	Different media can express the same issue from vastly different perspectives, producing conflicting beliefs in the public. In this way, climate science is politicized according to the stakes of different interests. The media shapes perceptions of climate change, impacts political positions and influences the support and opposition to policies. Communicative power is exerted on consumers, potentially misinforming and manipulating them. The trustworthiness of various claim-makers is of import.	Dissensus is seen as the result of conflicting information presented by different media. The politicization of climate change into a cultural politics is caused by variously interested interpretations and representations by different media. Social constructions, values, and worldviews are of concern in so far as they are influenced by vested interests. Scientific knowledge is seen as subjected to interpretive flexibility, and can become entangled in other conflicts.

The literature grouped under perspective II, critique, is methodologically grounded in media and communication studies. All four articles in this group analyse and discuss news media coverage and are thus, firstly, alike in methodology and research object. Articles of this perspective are at once interested in the various media channels and information sources, the actors that use these channels as platforms for their communicative efforts, and the receivers and consumers of the so mediated messages. The purpose of the so conducted research has several aspects. Topics of inquiry are, for one, the issue of framing, meaning the media's selection of "what the issue/problem is; who/what is responsible; and what the solution is" (Hansen, 2011, p. 15) and how, by doing so, they engage in the structuring of public and political attention and sense of urgency. Other concerns are the use of imagery and visual representations of climate change to, similarly to framing, promote or undermine a "sense of importance of the issue" (O'Neill, et al., 2013, p. 420), i.e. saliency, and how different vested interests employ messaging through media channels to "undermine competing positions" (Jaspal & Nerlich, 2014, p. 361). Lastly, the article by Brewer and Ley (2013) considers the question how all the above mentioned topics relate to issues of trust and credibility.

Three articles express an interest in the ways in which media communication exerts influence on and is itself influenced by ideologies, both of its audience and its own actors. Hansen (2011) in particular is concerned with the role that ideology plays in the

way that various media represent the issue of climate change (p. 10). Science communication, he argues, has moved from communicating neutral evidence-based information to a contest over "winning hearts and minds" (ibid., p. 8). To do so, the media employs various forms of communicative approaches, visualizations and framings to "bolster and privilege particular ideological views and perspectives on climate change over others" (ibid., p. 18). Jaspal and Nerlich (2014) similarly argue, that the representations of climate change found in different news media appear "consistent with the ideological tendencies of the outlets" (p. 359). This influence of ideology is however two-sided, with the media in turn reporting on issues "in ways that maintain the integrity of their readers' worldviews" (ibid., p. 360). In line with the focus of their article on trust, Brewer and Ley (2013) discuss how ideologies, which they relate closely to values, are a significant factor in supplying various information sources with credibility (p. 117). These ideological values and the trust they selectively provide "reinforce wider patterns of political and religious polarization surrounding environmental issues" (ibid., p. 129).

Related to the issue of influence and ideology, three of the four articles, excluding the study by Jaspal and Nerlich (2014), explicitly discuss the issue of power. Hansen (2011) problematizes how different social actors have "very different degrees of power and very different communicative resources" (p. 21), in particular how the media is in a position of unequal power from which it exerts significant influence on "public concern about and awareness of environmental issues" (p. 18). O'Neill et al. (2013) similarly begin their inquiry by positioning agents in the media as a powerful shapers of public awareness on whom people rely to "interpret and make sense of the many complexities surrounding climate science" (p. 413). The fact that a multiplicity of different media outlets exists, all of whom employ different interpretations and translations of the issue of climate change, produces what the authors call a "cultural politics of climate change" (ibid., p. 420), namely a politicisation of the issue by conflicting media messages. The form of power Brewer and Ley (2013) are interested in is, in line with their earlier mentioned concern for trust and credibility, one of an epistemic kind. Holding a position of credibility in the public is a social resource that can turn media which are trusted into "powerful outlets for communicating scientific claims" (p. 129). Closely related to their idea of reinforcement of ideology discussed above, information sources endowed with trust can exert significant influence on what positions and actors shape public policies, and by doing so reinforce their social power (ibid., p. 116).

The above mentioned concerns for power relate to the larger epistemic underpinnings and the question of the political within the literature of this perspective. It is argued that climate change in the form of its communicative representation, which ultimately is the form in which it is interpreted and made sense of by the public, is a contentious issue. Authors in this perspective refer to these contestations variously as "battles" (Hansen,

2011, p. 8), "conflicting arguments" (Brewer & Ley, 2013, p. 116), "cultural politics" (O'Neill, et al., 2013, p. 420) or "competing positions" (Jaspal & Nerlich, 2014, p. 361). Hansen (2011) further argues that "successful claims-making in society is closely related to the […] resources and political power" (Hansen, 2011, p. 20) that claim-makers have at their disposal. As such the positions that prevail in these struggles are always contingent. Further, as this contestation is actively taking place on the level of the information sources available to the public, i.e. between different media, the various selection processes between these sources produce the aforementioned cultural politics of climate change (O'Neill, et al., 2013, p. 413). As different people consume different information they assume different positions. What ultimately enables the differently interested contestation over the issue of climate change is referred to by Brewer and Ley as the "certain amount of interpretive flexibility" (Brewer & Ley, 2013, p. 116) of science, namely that science has to select between various methodological options such as which evidence to consider, how much of it to require, and how to conceive of the various solutions to such problems. This flexibility subjects any particular item of scientific knowledge to the contingency of various individual, organizational and cultural stakes that may cause a "politicization of environmental science" (ibid.).

To summarize, articles in perspective II, critique, are primarily interested in analysing, understand, and explicating the structures and conditions of media channels, in particular news media, and the role of various interests, values, and forms of power play therein. Rather than aiming to solve a designated problem through strategic forms of communication, the research aims at unfolding the ways in which different interests employ communicative strategies and the consequences these efforts have on the people they are aimed at. The issue of concern regarding dissensus about climate change is not that people inherently conceive of the idea differently, nor that climate science is inherently political, but rather that "the popular dissemination of scientific information can become entangled in broader political and religious clashes within society" (Brewer & Ley, 2013, p. 129). The "political leaning" (Jaspal & Nerlich, 2014, p. 358) of different media outlets, their "competing agencies and interests" (Hansen, 2011, p. 21), and their subsequently diverging representations of climate change can ultimately result, and in the example of Australia is argued to have resulted, in an "extremely politicised nature of the climate issue" (O'Neill, et al., 2013, p. 420).

4.3 Facilitation

Table 3. Perspective III: Facilitation

Articles	Perspective on CCC as a Practice and Research	Perspective on why CCC is of Concern	Perspective on the Political
Niles, Lubell and Brown; Rudiak-Gould; Evans, Milfont and Lawrence.	CCC is discussed and advocated as a bidirectional communication effort between communicators and communities to establish ties with each other, with the mutual aim of acquiring and providing knowledge about local and global processes of climate change. The purpose of researching CCC is to develop an understanding of the various climate contexts and capacities of different communities, the ways in which they relate and give meaning to climate change, and how to best establish reciprocal dialogue.	Different people are affected differently by climate change, and have different means and resources to draw upon in their response to it. Climate change responses such as adaptation and mitigation are not technological solutions that can be planned and implemented top-down. If climate change communicators want to develop the ability to aid in various responses to climate change, they need to develop an understanding of the different contexts in which people live and their experiences and practices.	Dissensus is discussed as the result of different contexts in which people live and the ways they are affected by and ultimately give meaning to climate change. Values and worldviews are of concern in so far as they are the basis from which climate change can be constructed as an issue worthy of attention and action. Scientific knowledge is discussed as contingent and in need to be translated into locally meaningful knowledge.

The third and least commonly found perspective, facilitation, was expressed in three of the analysed articles. The perspective expressed in the article by Evans, Milfont and Lawrence (2014) is in fact located somewhere between perspective I and III. While their impetus for climate change communication is more in line with the problem solving position of the first perspective, their differences in epistemology and conclusions drawn from their research ultimately made me group them under perspective III.

Articles in perspective III are methodologically grounded in social ecology and anthropology, and interested in the ways in which different communities in different respective contexts give meaning to and cope with climate change. The research in this perspective has a distinct interest in locality, including the local conditions and effects of climatic changes, the local resources and infrastructure available to actors, and the local knowledge of and meaning given to climate change (Niles, et al., 2015, pp. 179-181; Evans, et al., 2014, p. 71; Rudiak-Gould, 2012, pp. 47-48). Climate change is seen as both a global and local process that in its local dimensions has local consequences that require local responses. The category of responses that the articles are most concerned with are adaptation measures. Acknowledging that emission mitigation on a global scale may help in due course, Rudiak-Gould (2012) points to "locally developed adaptation measures" as the probable line of action to avert the most eminent damages. Similarly, Niles et al. (2015) argue that while mitigation measures may be a viable approach to alleviate the issue on a global scale, the development of "regional and local-based adaptation strategies" (p. 184) is the most

effective way to deal with climate change. The heterogeneity of local ecological contexts, it is argued, requires "regional focus and planning" (ibid.) and makes broad adaptation strategies unviable. Evans et al. (2014) further point out that local adaptation is not only an important measure in itself, but a crucial stepping stone for the discussion of other climate change responses that significantly increases people's "willingness to mitigate their own personal emissions" (p. 74).

In light of the locality of the necessary responses the articles argue for, they advocate for bottom-up approaches in the respective design and decision-making of these responses. Scientists have to learn about local conditions and constraints first before they can contribute to potential strategies. To develop adaptation practices that are viable for a region it is thus necessary, Niles et al. (2015) argue, to be "working with farmers and rural communities to assess the most limiting factors and related adaptation practices" (p. 184). Evans et al. (2014) similarly argue, that if scientists want to productively contribute to local adaptation measures they should "consider developing stronger ties to local governments and community engagement processes" (p. 74). They further point out that "discussions local councils and communities will have" (ibid.) between each other are likely to contribute to these responses. Rudiak-Gould (2012) goes further and argues that for a scientist to properly grasp local contexts and the possibilities they provide for conceptions of and responses to climate change, it is necessary to "discard the unidirectional model of science education in favour of a bidirectional model of dialogue" (p. 52). Scientists have to consider, he posits, that others (in the context of the argument that is Marshall Islanders) may have a "more holistic view of climate change" (ibid., p. 53) that science may not only educate but that in fact may educate science. If the cultural conceptions of climate change that science encounters are too wide, he concludes, then "perhaps scientific conceptions are too narrow" (ibid.).

It is clear that knowledge in this perspective is not limited to one consensual scientific understanding of climate change, but instead is contextually diverse and in many of its local dimensions held by local actors rather than scientists. Scientific knowledge and local knowledge, Rudiak-Gould (2012) argues, has to be mutually translated to become meaningful. Citizen knowledge of climate change is not necessarily by itself meaningful to scientists, and scientific knowledge of the issue not necessarily by itself meaningful to citizens (Rudiak-Gould, 2012, p. 46). In addition, the vast contextual divergence between how people factually are impacted and what values they give to these impacts inevitably produces differences in how they conceive and think of climate change.

Regarding the question of dissensus this means that for the issue of climate change, and once one assesses a context large enough or several contexts at once, it is inevitable. This does however not mean that this perspective ascribes political value to the contestation of the issue. For Niles et al. (2015) disagreement over climate change

is simply an unavoidable reality given the differences of ecological context people live in (p. 184), and rather posits an unfortunate hindrance to the actions that have to be taken in response. The article by Evans et al. (2014), which is the only of the three studies that problematizes let alone discusses the issue of a consensus gap between scientific and public agreement, has, if anything, a wistful hope for eventual consensus. While they, as mentioned above, point to inevitable future discussions, the authors prior to that subsume discussions under several other "methods for distributing information" (Evans, et al., 2014, p. 74) so that there is no indication that these are understood as involving any form of contestation or disagreement.

The article by Rudiak-Gould comes closest to presenting an argument for contestation by introducing the concept of promiscuous corroboration. In the context of his study, promiscuous corroboration refers to a consequence of the inapplicability of the term climate change to the language and culture of the Marshall Islands. Due to linguistic differences, the conception of climate change resulting from the Marshallese (Ebon) translation of the term covers areas ranging from weather, to climate, to space, to sociocultural practices, to time itself (Rudiak-Gould, 2012, p. 49). Climatic changes are, in the conception of the Marshallese language, inextricably linked to sociocultural changes. The resulting conflation of changes in nature and culture is, as Rudiak-Gould argues, "not a conceptual confusion, but a valid worldview" (2012, p. 52) and one that reifies the salience and significance of the issue to the Marshallese people. Rudiak-Gould thus argues that, as a promiscuous corroboration, the resulting disagreement over the conceptual understanding of climate change is not just beneficial but indeed necessary to endow the issue with local meanings (ibid.). This notion is however in no way equivalent to contentious democratic debate.

5. Discussion

The analysis reveals two aspects that apply universally to all analysed articles. First, all reviewed articles draw on, and explicitly so, social constructionist perspectives. This is insofar to be expected, and in fact validating of the approach to the database query, as the keywords used were explicitly designed to produce articles containing some element of subjectivity or construction. Interestingly enough however, I found that while the notion of a social construction of knowledge is consistently employed to describe and assess the reception of scientific knowledge by citizens, the knowledge on part of the researchers or science at large is seldom subjected to the same epistemic evaluation. This circumstance was most pronounced in the first perspective, persuasion, and less so in the second and third, critique and facilitation.

The second universally noticeable aspect of the analysis is the absence of an explicit or extended argument for the legitimate contestation of climate change. Rather, the literature is virtually exclusively arguing for a depoliticized unification of positions,

regardless of its otherwise different foci. A distinctly political position, one that does not reject contentious debate and disagreement as a mere hindrance to climate change responses but acknowledges it as an inevitable political reality that calls for the strengthening of democratic fora through which it may be productively practiced, was not found explicitly argued for in a single article. The paper by Rudiak-Gould (2012) in group III, facilitation, came closest with his argument for promiscuous corroboration. Rudiak-Gould's conception explicitly points to an instance in which a persistent, not merely processual, plurality of understandings of and positions towards the conception of climate change provides a valuable benefit to the ways in which humans cope with and give meaning and import to climate change. The idea of promiscuous corroboration does however refer to a contestation only in its dimension of disagreement and in so far as it relates to different understandings between differently situated contexts—in his specific case that between scientific and Marshallese understanding of the term climate change. There is no indication that a disagreement, let alone a contentious debate, within Marshallese society as such would be seen as an asset rather than an impediment.

Between the three groups I found a noticeable difference in disciplinary alignment. A certain degree of alignment between the various epistemologies, methodologies and study foci was, as a matter of course, expected. The extent to which the general impetus for and conclusions drawn from the research align with the methodologies and epistemologies within the groups is however notable. The by far largest of these groups of articles, perspective I, consisted almost exclusively of studies based in social psychological analyses. In light of the influence that psychologists and other behavioural scientists such as Carl I. Hovland had on the historical development of communication studies, in particular in the Anglo-American context from which most of the analysed articles come, this finding is not unexpected (Loblich & Scheu, 2011). What is noteworthy however is the extent of agreement between the articles as to what function climate change communication is to pursue in society and what roles scientists and experts on the one, and citizens and laypeople on the other hand ought to have. In this regard, articles of group I unanimously argue for various strategic efforts to exert some form of influence on people for equally varied purposes. The advocacy ranges from more educational approaches that aim to raise awareness or salience, to stimulating efforts targeted at increasing engagement or mobilisation, to persuasive endeavours that attempt to induce behavioural changes or secure compliance with policy measures. In this, the understanding of climate change communication in group I corresponds squarely to the top-down conceptions of strategic risk and change communication presented in chapter 2 on methodology. The conceived purpose of climate change communication is the establishment of agreement among citizens by making them either adopt or comply with the scientific understanding of climate change. Individual positioning of people is thereby seen not as a resource of fruitful

democratically contentious debate, but a hindrance to the top-down diffusion of knowledge and implementation of policy.

The methodologies of media and communication studies in perspective II were to be expected in an analysis of communication literature. Here it is important to point out how, within a similarly unidirectional conception of communication, a shift in attention from receiver, as in perspective I, to sender, as in perspective II, changes how defects within the communication system are attributed. In perspective I the issues of concern are flawed mental models and biased distortions on part of the public, while in perspective II the issues lie with the conflicts of ideologies and interests on the side of the media and its agents. The research impetus accordingly shifts from understanding people in order to strategically persuade them, to understanding media in order to critically denude them. In both these concerns, despite their differences, the two perspectives are in line with the definition of climate change communication presented at the outset of this study. They do, however, see themselves in different positions within the so devised inquiry, either as the ones pragmatically devising and conducting climate change communication, as in perspective I, or as the ones analytically assessing others engaged in these communicative efforts, as perspective II does. In its concerns for communicative power, perspective II touches on issues that may well be argued to apply not only to the context of news media but, as I have shown in the analysis of the literature in perspective I, academic literature too. Analysing how climate change communication experts use their communicative power to influence people may offer interesting new reflections.

The social ecological and anthropological approaches found in perspective III, particularly in Rudiak-Gould (2012) and Niles et al. (2015), are notable in their departure from the strategic definition of climate change communication. Rather than understanding climate change communication as a strategic effort devised by designated communicators and directed at various receivers, irrespective of seeing oneself or other media actors in this role, this perspective understands communication as a more reciprocal process in which both parties are actively involved. In its impetus it is at once similar to and different from perspective I—it shares the primarily pragmatic concern of contributing to more successful climate change responses, but it is primarily concerned with local adaptation measures rather than global mitigation efforts. It does, of course, widely disagree with how the methods and processes to do so are devised.

The issues of adaptation to and mitigation of climate change relate closely to the greater question of intergenerational equity. This concern for climate change as an intergenerational issue was, for example, explicated in the WCED's Brundtland Report's (1987) definition of sustainable development as accounting for the "needs of the present without compromising the ability of future generations to meet their own needs" (p. 43). Adaptation, as the mode in which we may adapt to the various climatic

changes happening right now, corresponds most closely with the needs of the present, while mitigation, meaning particularly the reduction of emissions to avoid further exacerbation of the issue, accounts more for future generations. As a highly complex problem, the questions this raises requires decisions on several levels, including ethical, economical, and ecological. Wherever decisions have to be made, experts are, of course, not far from offering recommendations on how people ought to make them. Economists have accordingly developed elaborate models that calculate and estimate various time discount rates and equity weighting factors according to which we can measure the inter-generational outcomes of investments into mitigation and adaptation (Hulme, 2009, p. 133). Ultimately, however, these rates and factors have to be set and decisions have to be made on the basis of value judgments that economic theory cannot prescribe.

It was further shown that with different methodologies and conceptions of communication come different epistemological positions. There is a rather distinct difference between perspective I and III in particular as to the degree to which they ascribe to a positivist foundationalism on the one and a more constructivist postfoundationalism on the other hand. To be sure, as I have pointed out before all articles apply some form of social constructionism and discuss how knowledge and meaning is constructed by people on the basis of social processes. In perspective I however, this is less so an epistemological argument than it is a psychological one. Scientific knowledge, and the consensual expert position that emerges from it, is in the first perspective not questioned as being itself socially contingent. Rather, it is the various biases and social processes that first cast this unquestioned scientific knowledge into question. In the foundationalist position expressed in this perspective, the various disagreements by the public are epistemically unjustified due to their non-alignment with science. To be sure, this is not to accuse the authors of scientism. It is, however, to say that there is a notable commitment to scientific knowledge as the epistemic foundation from whose support any epistemic positions towards climate change derive their justification. This is in contrast to perspective III, in which scientific knowledge carries an inherently contingent dimension. Regardless of whether a certain item of scientific knowledge is factually accurate, different local contexts may render this knowledge epistemically meaning-, and pragmatically useless. In any case the scientific understanding of climate change is, for the time being, incomplete, and responses to it require the aid of other forms of knowledge. This is, again to be sure, not to accuse these positions of relativism. It is to say, that non-scientific forms of knowledge can be justified, beneficial and, in fact, necessary, regardless of their degree of correspondence to scientific priors.

Recalling my introductory remarks on the concept of the political being as much an epistemic as it is a political positioning, we can see this argument confirmed in the

convergence of epistemology and political consequence in the here assessed perspectives I and III. The positions arguing for an active, top-down subversion or circumvention of disagreement align with those assuming a foundationalist understanding of scientific knowledge and the solutions presented by it. Equally, the positions that are open to differences in perceptions and understandings of climate change and acknowledge the value of various bottom-up contributions of knowledge align with those that express limitations to scientific solutions and assume a more postfoundationalist stance towards the validity of knowledge.

Two articles stand out in the severity of their conception of communicative top-down processes, namely those by Stoknes (2014) and Sterman (2011). Stoknes' solution to what he titles the climate paradox is a self-described radical rethinking of climate communication along the lines of a behavioural inducement enterprise. The ultimate goal of this endeavour is to produce a majority compliance with the technological solutions to climate change as they are defined by scientific knowledge. What Stoknes offers here is of course not just a radical rethinking of climate communication but, in fact, a radical rethinking of democracy—if one wishes to still call it that. Not only does his account of the political processes involved in climate change reject any form of citizen input, but they border on subverting even the bare minimum of aggregative forms of democratic politics. Sterman in turn does not offer a similar clear-cut solution to what he considers the ills of democracies. The ineptitude of democratic citizens he professes, namely in knowing or deciding things, may of course justify their exclusion from political decision making processes. As he, however, applies this ineptitude to seemingly everyone that is not an expert, the vestige of decision makers remaining would hardly qualify as a democracy.

The notions of induced agreement discussed here are far removed from the philosophical debates surrounding ideas of rational consensus, methodological monism, or deliberative democracy by thinkers such as Rawls, Peirce or Habermas. Rather, we are faced with what may aptly be titled a self-denying plea for technocracy. The implied notion is that society ought to merely be guided and educated on issues it, tragically, is ignorant towards. It is the so achieved enlightenment that is argued to harmonize and guide the actions of people, not a technocratic dictate. This idea is of course as old as continental philosophy itself, and was exposed as the amalgamation of technocracy and enlightenment in what Karl Popper calls "utopian social engineering" (Popper, 2013, p. 21) all the way back in Plato's Republic.

The issue of both Stoknes' and Sterman's positions in particular, and those of the perspective to which they belong in general, is of course not merely an ideological conflict between technocracy and democracy but in many ways of pragmatic concern. As the discussion of the articles in perspective III have shown, top-down processes of technologically devised and implemented solutions to climate change are contextually

limited in their applicability. Given the incompleteness and limitation of scientific knowledge of climate change, solutions devised solely on the basis of this knowledge are inevitably incomplete and limited. Not only is climate change as of now scientifically underdetermined, but it involves questions that lack ultimate, scientifically correct answers—answers that may simply not be found in the scientific realm. From the discussion above it is for example clear, that weighing between mitigation and adaptation is inherently a decision that has to be made on the grounds of value judgements. It cannot be made on the basis of a scientific understanding of the physical processes of climate change. In any case, however, knowing what climate change is and will be on the basis of meteorological understanding does not translate into knowing what it is and will be to the humans that face it.

In his historical account of climate conceptions, the American geographer Milliam Meyer (2000) points to the fallaciousness of a "metereological fundamentalism" (p. 71) that subordinates human action to its climatic contexts. As desirable as such a determinism may be to some, social contexts and conditions cannot be extrapolated from natural ones. While the majority of positions found in this analysis avoid, by course of their methodological concerns for people, ascribing to a scientific reductionism that removes human beings from the equation, they tend to reduce them to a manipulable variable within it. Human agency is, however, hardly reducible to issues of compliance and resistance, like the level of lubrication of a cog in a wheel. Even the most pragmatist perspectives are forced to admit that this agency inevitably invokes questions of vastly different values and worldviews that act in vastly different contexts which are vastly underdetermined by our scientific understanding.

6. Conclusion

It is an unfortunate circumstance that with increasing potency of human action on climatic changes, the unmediated perceptibility of their consequences increasingly distances itself from the social realities in which people live. A cooling of local temperature following the drainage of swamps leaves both a cause and effect open to the immediate recognition of the people it affects. A global sea water rise of somewhere around 2 millimetres per year due to carbon dioxide concentrations in the atmosphere has far more substantial consequences but obscures any direct and immediate imputability. It is consequently understandable that science shows much concern regarding the communicative dissemination of its insights into the phenomenon—knowledge without which humanity would unquestionably be more ignorant towards what climate change is and what is causing it. These circumstances make climate change communication rightly an important project of the scientific community. What this communication is to look like, however, is not reducible to the question of how to effectively instil knowledge and induce action. Such a reductionism

presupposes not only what role experts and the public ought to have in the ordering of society, but what climate change communication itself is.

Given how engrained the transmission conception of communication is in Western culture, it is perhaps not surprising that the very idea of a specific form of communication produces a unilateral conception of how it ought to be conducted. Take in addition then the venerating conception of the role of experts and professionals, and it is indeed easy to envision what climate change communication ought to look like: a strategic communication effort aimed at educating and persuading people to act in certain specified ways. Once we look behind the presuppositions of our epistemic heritage however, we can envision climate change communication as a democratic facilitation that does not impose a presumed epistemically privileged, particular position for society to adopt. Rather, it can be a process of opening up and strengthening channels of communication and participation; public fora for contentious political debate over the inherently political question of how we ought to organize society in response to climate change. Fora that provide the resources for information and expression; an exchange of knowledge rather than its imposition. It is, to be sure, myopic to presume that so established processes produce a participatory equity that allows for everyone to equally have his voice heard and considered. It is equally myopic to presume each and any position to be equally valuable and contributing to this so unfolding debate. It is, however, worth to consider that the evaluation of these positions ought to be the prerogative of those who carry the right for their approval and the responsibility for their consequences. It calls, however, in any case for a rejection of the assumption that a unified body of scientific knowledge allows for a predetermination of interests, values, and convictions.

Politics in liberal democratic systems are negotiations about the principles in which to invest and according to which to organize action—debates over what is right and wrong, true and false, just and unjust. It stands to reason to assume that these negotiations are indebted to conceptions about what is known. This finds its expression in the finding, that those positions that acknowledge a constant contestability of what to think and do about climate change are the same that are farthest from subscribing to an objective determination of scientific knowledge. That we can find a convergence of epistemology, methodology and the conceptions of climate change communication reveals no less than the fact that scientists are just as all other members of the public subject to their contexts and conditions. Scientific positions on what climate change is and what ought to be done about it are contingent on which of the various existing scientific perspectives are taken. Many of the communication experts discussed in the preceding analysis have been so concerned with understanding what influences the positions of others that they forgot to assess what influences their own.

These concerns are of particular importance for the discussion of climate change, as it presents a strikingly convoluted and political issue. It is a process first and foremost caused by the opulence of the richest, most industrialized nations, that will first and foremost confront the poorest, least industrialized ones, with mitigation solutions developed and presented by the former that may well stifle the development of the latter, a development that is much needed to alleviate contemporary destitution while being well on its way to exacerbate it in the future. The assumption that the plethora of questions emerging from this situation can be answered by meteorological definitions and psychological disseminations exceeds the scope of the term ambitious. We are fortunate enough that human diversity offers us a multitude of arguments for a multitude of perspectives. We are rightfully committed to a diversity and plurality in the arts, languages, religions, traditions, cuisines, sports, and ecological systems. We are, then, equally right in committing to the diversity and plurality of the perspectives and values they produce. To be sure, just as there are cuisines that will be healthier to the body, there are perspectives and political decisions towards climate change that will be more conducive in sustaining a habitable planet and human prosperity. And just as science can help us understand what a certain food does to the body, is has an important role to play in contributing to our understanding of climate change and the prospects of various responses towards it. One may go as far as to commit to the belief that the best process by which to arrive at these perspectives is that of scientific inquiry. But even the shortest survey of our history reveals that the perspectives pronounced as scientific fact seldom hold their position for long, and that the dissenting perspectives that they rejected may, in fact, be closer to the truth. Why, then, should they not be given their say?

A critical reader may at this point question whether such a call for the comprehensive contention of positions on climate change does not enforce a relativism that refuses to distinguish between bad and good ideas. The commitment to a contentious debate over climate change is however the very opposite to a submission to relativist ambivalence. It is this contentious process such a commitment ensures through which good ideas can be distinguished from bad ones. Just as it is our responsibility to protest that which we deem wrong, it is our responsibility to argue for that which we deem right, and to do so impassionedly and on the basis of our convictions. To argue for our ideas of the future is to participate in the political. It is to enact our role as citizens alongside the other members of the public of which we are part, not as conductors that dictate what voices ought to be heard. If the scientific community considers itself privileged to posit knowledge claims, then it is its privileged responsibility to enable their contestation—to establish and strengthen the fora through which ideas can be expressed and positions articulated. As citizens, it is in our very self-interest to do so, and it strengthens the democratic processes of which we ourselves are part. In the last analysis, political decisions are undecidable. They can,

however, be subjected to opinion, and are thus best made by an opinionated public that includes but is not limited to the experts among it.

References

Bollen, K. A. & Paxton, P., 2000. Subjective Measures of Liberal Democracy. *Comparative Political Studies,* 33(1), pp. 58-86.

Brewer, P. R. & Ley, B. L., 2013. Whose Science Do You Believe? Explaining Trust in Sources of Scientific Information About the Environment. *Science Communication,* 35(1), pp. 115-137.

Burr, V., 2003. *Social Constructionism.* 2nd ed. s.l.:Routledge.

Cox, J. R., 2010. Beyond Frames: Recovering the Strategic in Climate Communication. *Environmental Communication,* 4(1), pp. 122-133.

Craig, R. T., 1999. Communication Theory as a Field. *Communication Theory,* 9(2), pp. 119-161.

Elsevier, 2018. *Scopus - An eye on global research: 5,000 publishers. Over 71M records and 23,700 titles.,* s.l.: s.n.

Elving, W. J., 2005. The role of communication in organisational change. *Corporate Communications: An International Journal,* 10(2), pp. 129-138.

Evans, L., Milfont, T. L. & Lawrence, J., 2014. Considering local adaptation increases willingness to mitigate. *Global Environmental Change,* Volume 25, pp. 69-75.

Genilo, J. W., 2018. Rethinking Crisis Communication at a Time of Climate Change: Lessons from the Philippines. In: K. Prasad, ed. *Communication, Culture and Ecology - Rethinking Sustainable Development in Asia.* s.l.:Springer, pp. 131-141.

Hansen, A., 2011. Communication, media and environment: Towards reconnecting research on the production, content and social implications of environmental communication. *the International Communication Gazette,* 73(1-2), pp. 7-25.

Howell, R. A., 2011. Lights, camera ... action? Altered attitudes and behaviour in response to the climate change film The Age of Stupid. *Global Environmental Change,* Volume 21, pp. 177-187.

Hulme, M., 2009. *Why We Disagree About Climate Change - Understanding Controversy, Inaction and Opportunity,* s.l.: Cambridge University Press.

IPCC, 2014. *Fifth Assessment Report - Climate Change 2014 Synthesis Report,* s.l.: s.n.

Jaspal, R. & Nerlich, B., 2014. Fracking in the UK press: Threat dynamics in an unfolding debate. *Public Understanding of Science,* 23(3), pp. 348-363.

Kahan, D., 2010. Fixing the communications failure. *Nature,* Volume 463, pp. 296-297.

Kronrod, A., Grinstein, A. & Wathieu, L., 2012. Go Green! Should Environmental Messages Be So Assertive?. *Journal of Marketing,* Volume 76, pp. 95-102.

Laclau, E. & Mouffe, C., 2001. *Hegemony and Socialist Strategy - Towards a Radical Democratic Politics.* 2nd ed. s.l.:Verso.

Lee, T. M. et al., 2015. Predictors of public climate change awareness and risk perception around the world. *Nature Climate Change,* Volume 5, pp. 1014-1023.

Levy, B. S. & Patz, J. A., 2015. Climate Change, Human Rights, and Social Justice. *Annals of Global Health,* 81(3), pp. 310-322.

Loblich, M. & Scheu, A. M., 2011. Writing the History of Communication Studies: A Sociology of Science Approach. *Communication Theory,* Volume 21, pp. 1-22.

Manzo, K., 2010. Beyond polar bears? Re-envisioning climate change. *Meteorological Applications,* Volume 17, pp. 196-208.

Meyer, W. B., 2000. *Americans and Their Weather.* s.l.:Oxford University Press.

Moser, S. C., 2010. Communicating climate change: history, challenges, process and future directions. *WIREs Climate Change,* 1(1), pp. 31-53.

Mouffe, C., 2008. *Critique as Counter-Hegemonic Intervention.* Vienna, European Institute for Progressive Cultural Policies.

Mouffe, C., 2013. *Agonistics: Thinking The World Politically.* s.l.:Verso Books.

Neumann, J., 1985. Climatic change as a topic in the classical Greek and Roman literature. *Climatic Change,* 7(4), pp. 441-454.

Niles, M. T., Lubell, M. & Brown, M., 2015. How limiting factors drive agricultural adaptation to climate change. *Agriculture, Ecosystems and Environment,* Volume 200, pp. 178-185.

Nursey-Bray, M. et al., 2012. Communicating climate change: Climate change risk perception and rock lobster fishers, Tasmania. *Marine Policy,* Volume 36, pp. 753-759.

Obama, B., 2017. Barack Obama on food and climate change: 'We can still act and it won't be too late'. *The Guardian*.

Ockwell, D., Whitmarsh, L. & O'Neill, S., 2009. Reorienting Climate Change Communication for Effective Mitigation Forcing People to be Green or Fostering Grass-Roots Engagement?. *Science Communication,* 30(3), pp. 305-327.

O'Neill, S. J., Boykoff, M., Niemeyer, S. & Day, S. A., 2013. On the use of imagery for climate change engagement. *Global Environmental Change,* Volume 23, pp. 413-421.

Pearce, W. et al., 2017. Beyond Counting Climate Consensus. *Environmental Communication,* 11(6).

Pepermans, Y. & Maeseele, P., 2016. The politicization of climate change: problem or solution?. *WIREs Climate Change,* Volume 7, p. 478–485.

Phillips, L. & Jorgensen, M. W., 2002. *Discourse Analysis as Theory and Method.* s.l.:SAGE Publications.

Pidgeon, N. & Fischhof, B., 2011. The role of social and decision sciences in communicating uncertain climate risks. *Nature Climate Change,* Volume 1, pp. 35-41.

Poortinga, W. et al., 2011. Uncertain climate: An investigation into public scepticism about anthropogenic climate change. *Global Environmental Change,* Volume 21, pp. 1015-1024.

Popper, K., 2013. *The Open Society and Its Enemies, Volume 1.* Princeton Ed. ed. s.l.:Princeton University Press.

Rescher, N., 1993. *Pluralism - Against the Demand for Consensus.* s.l.:Clarendon Press.

Reynolds, B. & Seeger, M. W., 2005. Crisis and Emergency Risk Communication as an Integrative Model. *Journal of Health Communication,* Volume 10, p. 43–55.

Rudiak-Gould, P., 2012. Promiscuous corroboration and climate change translation: A case study from the Marshall Islands. *Global Environmental Change,* Volume 22, pp. 46-54.

Scannell, L. & Gifford, R., 2013. Personally Relevant Climate Change: The Role of Place Attachment and Local Versus Global Message Framing in Engagement. *Environment and behavior,* 45(1), pp. 60-85.

Schafer, M. S., 2012. Online communication on climate change and climate politics: a literature review. *WIREs Climate Change.*

Schweizer, S., Davis, S. & Thompson, J. L., 2013. Changing the Conversation about Climate Change: A Theoretical Framework for Place-Based Climate Change Engagement. *Environmental Communication: A Journal of Nature and Culture,* 7(1), pp. 42-62.

Spence, A. & Pidgeon, N., 2010. Framing and communicating climate change: The effects of distance and outcome frame manipulations. *Global Environmental Change,* Volume 20, pp. 656-667.

Sterman, J. D., 2011. Communicating climate change risks in a skeptical world. *Climatic Change,* Volume 108, pp. 811-826.

Stoknes, P. E., 2014. Rethinking climate communications and the "psychological climate paradox". *Energy Research & Social Science,* Volume 1, pp. 161-170.

Storch, H. v. & Stehr, N., 2006. Anthropogenic Climate Change: A Reason for Concern Since the 18th Century and Earlier. *Geografiska Annaler,* 88(2), pp. 107-113.

United Nations, 1992. *United Nations Framework Convention on Climate Change,* New York, US: s.n.

WCED (World Commission On Environment and Development), 1987. *Our Common Future.* s.l.:Oxford University Press.

Wibeck, V., 2014. Enhancing learning, communication and public engagement about climate change - some lessons from recent literature. *Environmental Education Research,* 20(3), pp. 387-411.

Winter, U., 2013. Asymmetry and the Political: Paradigms for a Cultural History of the Iberian Twentieth Century. In: J. R. Resina, ed. *Iberian Modalities: A Relational Approach to the Study of Culture in the Iberian Peninsula.* s.l.:Liverpool University Press, pp. 129-143.

Zia, A. & Todd, A. M., 2010. Evaluating the effects of ideology on public understanding of climate change science: How to improve communication across ideological divides?. *Public Understanding of Science,* Volume 6, pp. 743-761.