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What is Public Engagement and How Does it Help to Address Climate Change? A Review of Climate Communication Research

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ABSTRACT
This article examines the conceptualization of public engagement in research on climate communication. The review focuses on how public engagement is defined and how its relation to societal change and communication is thematized. In the majority of the reviewed work the term public engagement is used without being explicitly defined. Public engagement, communication, and societal change are approached predominantly from a psychological perspective that emphasizes personal engagement with climate change. The processes that connect what people personally think, feel, and do about climate change to the societal change required adequately to address the issue are rarely elaborated. Communication is predominantly approached as a pragmatic tool that can be used to address climate change rather than an object of theorization. The review concludes with a discussion of sociologically oriented research on climate communication.

Public engagement is a critical aspect of the response to climate change. Achievement of the required rapid social change with the consent and participation of the population demands effective communication and the active engagement of the public. (Clarke et al., 2020.) Climate scientists and others are urged to communicate the issue in a way that non-scientific audiences can understand, that makes it more relevant to their lives and experiences, and inspires them to take action (Corner et al., 2018; Corner & Clarke, 2017). Social scientific research on public engagement with climate change has identified multiple motivations and barriers, along with diverse methods, facilitators and scales of engagement (Whitmarsh et al., 2013). Research on climate communication has focused on finding the most effective communicative means for bridging the gap between climate science and public engagement (Moser & Dilling, 2011).

Public engagement is a critical issue in addressing climate change, but it is also a notoriously ambiguous concept that – perhaps precisely because of its versatility – has become very popular in research and policy discourses (Berger, 2009; Rowe & Frewer, 2005). The impetus to increase public engagement is particularly prominent in discourses concerning environmental issues, justified in claims that citizens in a democracy should be empowered in decision-making processes, that the resulting decisions would be of better quality, that it would foster citizens' consent and trust, and that engagement would contribute to changing public attitudes and behaviors in a positive direction (Carvalho et al., 2017, p. 123; Höppner, 2009, p. 1). In the context of climate change, public engagement typically connotes personal engagement and behavioral change in consumption and eating habits, energy use, transportation, and other lifestyle choices (Whitmarsh et al., 2010).

However, it may also mean participation in democratic decision-making (Blue, 2017), an orientation towards collective problem-solving (Rask & Worthington, 2018), or involvement in a political struggle (Carvalho et al., 2017) – each building up an array of specific tasks and roles for the public.[1]

This article reviews the meanings given to public engagement in climate communication research. This growing field of research has already been mapped in several literature reviews and introductory texts.[2] The persistent lack of public engagement with climate change is a central problem that climate communication research purports to address (Whitmarsh et al., 2013). The key role of public engagement in addressing climate change and the importance of communication in engaging the public are major reasons supporting a review of the meanings given to public engagement in research on climate communication. The present review combines current knowledge of the varying meanings of public engagement, both as a social goal and as an object of research, which is relevant to both research and practice.

In addition to addressing the meanings given to public engagement, this article also focuses on the thematization of societal change and communication in the related research on climate communication. The societal change required adequately to address climate change is inextricably interwoven with the notion of public engagement. Researchers focusing on climate communication have tended to approach this relation from the perspective of (social) psychology focusing on individual engagement as the driver of societal change. (Carvalho et al., 2017, p. 124.) The question of societal change connects this review to a more general discussion concerning the role of social sciences, sociology, and social theory in research on climate change (e.g. Dunlap & Brulle, 2015; Hackmann et al., 2014). Climate change has been predominantly approached from the perspective of *ecological imagination*, meaning how the climate system responds to human activities, and much more rarely in terms of *sociological imagination*, meaning how social systems structure the causes and consequences of climate change and potential responses to it (Norgaard, 2018). In focusing on the relation between public engagement and societal change, this review raises questions concerning the role of sociological imagination in climate communication research.

Cultivating sociological imagination helps to enhance understanding of public engagement and communication as systemic phenomena that reach far beyond individual attitudes, emotions, and behavior. Individual engagement is one dimension in the problematic of climate change, public engagement, societal change, and communication. Sociological imagination may sensitize empirical analyses to the necessary limits of climate communication and public engagement as instruments of systemic change, relating them to other social forces that generate, maintain, and transform the social structure that is both the cause of climate change and the condition of addressing it.

Climate communication is a recent addition to the long list of topically focused sub-fields within the research on communication studies. It derived not from scholarly interest in communication but from practical interest in effective communication (Moser, 2010, p. 33). The pragmatic orientation has been helpful in establishing climate communication as a research field and increasing its societal impact. However, it has also led to "a curiously truncated view of communications research as being about finding the right words and checking if people have listened" (Nerlich et al., 2010, p. 106). Communication is inadequately theorized in research on climate communication (Ballantyne, 2016).

This article examines how communication is thematized in the research on climate communication that concerns public engagement with climate change. Understanding communication as an instrument of individual engagement gives climate communication research a different purpose than approaching communication as a constitutive process that defines the problematic concerning climate change, societal change, engagement, and communication. Keeping in mind the diversity of theoretical approaches towards communication is important notwithstanding the social impetus to approach climate communication as a strategic mission. It can clarify how climate communication research relates to the field of communication research and to climate communication as a practice.

In line with these justifications, the article at hand presents a review of how the interlinked notions of public engagement, societal change, and communication are used in research on climate communication. The review is contextualized in the following section, with brief excursions in some of the general directions in which these notions are thematized in research concerning climate change. The material for review and the methods are presented below, followed by an analysis of each of the three focal notions – public engagement, societal change, and communication – in turn. The article concludes with a discussion concerning the potential of sociologically oriented research on climate communication, and suggests theoretical and empirical directions for future work.

Public engagement and climate change

Public engagement and other similar concepts such as civic engagement, public participation and public involvement assumed importance during the 1990s in a variety of policy and research contexts (Berger, 2009; Johnston & Taylor, 2018; Rowe & Frewer, 2005). As discursive innovations they were related to the participatory turn that underscored the importance of involving citizens, customers, employees, and stakeholders in the activities of governments, businesses, scientific and arts institutions, and organizations of various kinds (Pieczka, 2018, p. 549).

In the case of climate change, the impetus towards public engagement connects to the history of environmental governance where public input has been pursued readily compared to many other fields (Blue, 2017; Carvalho et al., 2017, p. 123). In addition, and beyond the obvious reasoning that the magnitude of climate change demands it, there are at least three major contextual factors that have contributed to the way in which public engagement has been adopted as a policy goal and as a research object. First, in science and technology studies, the concept has been related to a move from "deficit to dialogue" in science communication (Stilgoe et al., 2014, p. 5), in other words from approaching the public as knowledge deficient and in need of education towards pursuing a dialogical relationship with scientists that involves listening to popular views and negotiating the meaning of scientific and technological issues (Carvalho et al., 2017, p. 123). Second, there has been multidisciplinary research on individual engagement as a psychological construct comprising affective, cognitive, and behavioral dimensions (Johnston, 2018, p. 17). Third, in political science and political theory, civic engagement has been promoted as a solution to the democratic deficit in decision-making with the potential to increase its quality and capacity (Berger, 2009).

The nature of public engagement with climate change

The research on climate change approaches public engagement from two connected but rarely integrated perspectives (Höppner & Whitmarsh, 2011, p. 49). First, personal engagement implies "a personal state of connection with the issue of climate change" that "comprises cognitive, affective and behavioral aspects" (Lorenzoni et al., 2007, p. 446), which from the psychological perspective "involves what people think, feel and do about climate change": it is typically associated with knowledge, awareness and perceptions of climate change, with related attitudes, emotions, and values, and with behaviors that cause or help mitigate it (Whitmarsh et al., 2013, p. 9).

Second, climate change is also approached from the perspective of civic engagement that entails participation of the people in collective problem-solving, policy-making, deliberation and dialogue (Lorenzoni et al., 2007, p. 446). Research on climate change has not produced a single definition of civic engagement that is equivalent to the definition of personal engagement presented above. Formalized participatory initiatives such as public consultation, consensus conferences, citizen juries, focus groups, and deliberative polling are typical objects of research focusing on civic engagement with climate change (Blue, 2017). Rask and Worthington (2018), for example, define public engagement from this perspective as "processes that provide a distinct role for citizens or stakeholder

groups in policymaking". It could also be considered political engagement, the focus being on "the political fabric of climate change" rather than individual-level behavior related to consumption and lifestyle (Carvalho et al., 2017, p. 124).

Public engagement and societal change

The desired outcome of public engagement with climate change is societal change aimed at mitigating its effects and facilitating adaptation to it (Clarke et al., 2020). There is obviously no simple blueprint for such change. Nevertheless, it is worth noting that research on public engagement with climate change rarely theorizes societal change beyond the ABC model, according to which it depends on values and attitudes (A), which are believed to drive the kinds of behavior (B) that individuals choose (C) to adopt (Shove, 2010). Studies on personal engagement typically focus on overcoming psychological barriers that prevent people from changing their behavior so as to address climate change (van der Linden et al., 2015). From this perspective, personal engagement becomes a social force when people change their behavior, embrace a low-carbon lifestyle, and participate in decision-making, for example.

Research focusing on climate engagement as a public process rather than an individual-level phenomenon typically identifies the political system as the main driver of societal change (Carvalho et al., 2017; Ockwell et al., 2009). Civic and political engagement underscore the processes of democratic decision-making, which reveal tensions between normative, instrumental, and substantive perspectives concerning the relation between public engagement and societal change (Blue, 2017). From a normative perspective, public engagement is intrinsically valued as a means of democratic expression irrespective of its outcome in addressing climate change. From an instrumental perspective it is considered valuable because it brings certain elements – such as knowledge, resources, trust, and accountability – to collective decision-making on climate change. It is also considered valuable from a substantive perspective because in making a creative contribution to collective problem-solving it helps to address climate change.

Communication and public engagement

There are two widely acknowledged paradigms through which to approach communication as an object of research (see e.g. Craig, 1999). Understood as transmission, it is perceived as an instrument that can be used to transfer information. The main question that arises concerns the effectiveness of such communication in achieving the effects that the sender intended. The constitutive view, on the other hand, concerns communication as a social process that constitutes the reality for its participants. Hence, communication is a "symbolic process whereby reality is produced, maintained, repaired, and transformed" (Carey, 2008, p. 48). These two approaches are not necessarily mutually exclusive. The constitutive model could be understood as a meta-model that includes transmission as one particular model of communication among others (Craig, 1999).

The research on climate communication is characterized by a pragmatic and strategic orientation towards climate change that tends to result in a transmission-oriented conceptualization of communication as a means of conveying compelling messages to a broad audience (Ballantyne, 2016). Accordingly, communication is a means of engaging the public with climate change. Proponents of the constitutive perspective on climate communication acknowledge that climate change is not only a physical phenomenon waiting to be addressed and communicated, but also an ideological, cultural, and symbolic issue that acquires its meaning in the process of communication (e.g. Hulme, 2009). Accordingly, communication is a means of engaging the public, but it is also inevitably among the social processes that define the issue of climate change, the range of possible responses to it, and the role of the public.

Material and methods

The material for this review was collected following a *Web of Science* search (conducted 2/18/2021) for documents mentioning both "public engagement" and "climate change communication" or "climate communication" in the title, abstract, or as a keyword. The relatively narrow search criteria were intended to focus the review on climate communication research that explicitly addressed public engagement. The search identified 44 documents, all of which are included in the review. The year of publication ranges from 2009 to 2021, although a substantial majority (34) of the documents were published in 2015 or later. The material includes two book chapters and two editorials in addition to the journal articles. The journals publishing most of the articles include *Environmental Communication* (7), *Wiley Interdisciplinary Reviews: Climate Change* (5), and *Science Communication* (5).

The review was conducted in two phases. During the first round all the documents were scrutinized for explicit definitions of public engagement and explicit thematizations of societal change and communication. Those that at first sight seemed to rely on a specific understanding of public engagement, societal change, or communication but did not clearly thematize these issues were flagged for further analysis. These flagged documents were scrutinized again during the second round, along with documents containing explicit definitions and thematizations to determine whether the implicit thematizations merited further analysis.

The research questions guided the analyses. Two questions concerned the nature of public engagement and what it means: How is public engagement defined in this document? Is public engagement approached as personal engagement, civic engagement, or something else? Three questions focused on public engagement and societal change: How is societal change discussed in this document? Does this document identify the mechanisms that mediate personal engagement, individual behavior, and societal change? If engagement is understood as civic engagement, is it approached from a normative, an instrumental, or a substantive perspective? Finally, two questions concerned the role of communication: How is communication defined in this article? Does it mean the transmission of messages or is it a social process that constitutes reality, or is it both?

Definitions of public engagement

Public engagement is rarely defined in the 44 documents reviewed for this article: in only six of them do the authors explicitly explain what the term means. Instead, it is frequently used as a general referent to captivating people with the issue of climate change in a positive manner or involving them in activities related to mitigation or adaptation. Minimally, public engagement is only mentioned as a keyword, and not used at all in the body text. Several articles use the term repeatedly, even in headings and subheadings, without defining it (e.g. O'Neill et al., 2013).

The documents connect public engagement to a variety of themes ranging from the potential of a coffee-drinking experience as a means of individual engagement (Eiseman & Jonsson, 2019) to developing a culture-centered framework promoting a deliberative approach to public engagement (Munshi et al., 2020). None of them explicitly problematize the objective of public engagement with climate change, but the lack of such a focus in research on climate communication is noted (Okoliko & de Wit, 2021, p. 37). However, critical views are not altogether absent. Corner and Randall (2011), for example, provide a comprehensive critique of social marketing – the systematic application of marketing concepts and techniques to achieve specific behavioral goals relevant to the social good – as a strategy for public engagement with climate change.

Public engagement is primarily approached from the perspective of personal engagement. However, many of the articles that explicitly conceptualize it from this perspective also acknowledge its civic dimension. For example, as Wibeck (2014, p. 391) proposes in her review of research literature on climate-change-related communication and education, "instead of being mere receivers of

climate change messages, public engagement means that the public needs to actively take part in learning and action on climate change". This means forming a personal state of connection with the issue of climate change (personal engagement), as well as participating in climate science and policy processes (civic engagement) (Wibeck, 2014). In a similar manner, Ockwell et al. (2009, p. 306, 321) define engagement from the perspective of personal engagement as having "three key components: cognitive (understanding/knowledge), affective (emotion/interest and concern), and behavioral (action)", but they also note that political engagement "represents a crucial fourth dimension of public engagement with climate change".

Articles making frequent mention of the term public engagement without explicitly defining it typically concern empirical studies that operationalize it as personal engagement. They connect public engagement to individual perceptions, beliefs, feelings, attitudes, and knowledge, among other things. O'Neill et al. (2013), for example, focus on how engaging climate-change images were in terms of salience ("this image makes me feel climate change is important") and efficacy ("this image makes me feel I can do something about climate change").

Three of the articles in the research material define public engagement from the perspective of civic engagement. In their commentary article focused on developing a culture-centered framework for a deliberative approach to public engagement with climate change, Munshi et al. (2020, p. 574) differentiate their perspective from engagement efforts that over-emphasize individual attitudes, behavior, and choice as the target of policy intervention. In their framework they identify values, place, power, and narrative as the four domains that "together co-constitute culture as lived experience and encompass a deliberative approach to public engagement" (Munshi et al., 2020). Citizen panels and other deliberative processes "pull together the experiences of a wide range of people, articulated through an interplay of scientific and indigenous knowledge, and understood through the domains of values, place, power, and narrative, to shape and communicate diverse and contextual strategies for long range climate change adaptation" (Munshi et al., 2020, p. 578).

In an article on adaptation to climate change at the community level, Moser and Pike (2015, p. 112) define engagement as "purposeful deliberation processes of involving the public in matters of public concern and decision-making, in this case climate change, sometimes over an extended period of time". In their view, civic engagement precedes individual engagement. Purposeful deliberation processes, when effective, may enable individuals to become "cognitively, emotionally, behaviorally, professionally, socially, spiritually, civically and/or politically involved and vested in the issues" (Moser & Pike, 2015).

Okoliko and de Wit (2021) conceptualize public engagement vis-à-vis the concepts of person and community from an Afro-relational perspective that underscores communion or relationship as the foundation of cultural and political life. In their view, Africa's propensity for bounded ties and the treatment of sociality as relations of persons-in-community facilitate the reimagining of mediated climate change communication as "a participatory model allowing inputs of people (in their diverse modes) to make sense of local experiences (such as changes in agricultural practices) in relation to climate change problems" (Okoliko & de Wit, 2021, p. 46).

Public engagement and societal change

The material reviewed for this article approaches public engagement primarily as a means of addressing climate change. A lack of public engagement is identified as a problem to be addressed in the field of climate communication and associated research. Strategic interest in strengthening public engagement with climate change contrasts with the minimal sociological interest in mechanisms and processes that connect public engagement to the systemic change required to address climate change. The strategic aim of strengthening engagement is connected to a range of themes including human values and cultural worldviews (Corner et al., 2014), climate-change imagery (O'Neill et al., 2013), the media (Thaker et al., 2017), national parks and wildlife refuges (Schweizer

et al., 2013), conversations with friends and family (Goldberg et al., 2019), and personal experiences of extreme weather events (Matthews et al., 2016).

According to Victoria Wibeck's (2014, p. 394) review of the research literature on climate change communication and education, which is included in the research material considered in this article, it is commonly argued that the public must be engaged individually and collectively in addressing the issue, but views on how such responses are achieved and how they change society vary. Wibeck identifies political influence, participation in climate science, and policy dialogue as three main ways of conceptualizing the societal influence of engagement.

Despite the minimal interest in elaborating the mechanisms and processes that make public engagement the social force it is assumed to be, a few articles do thematize this issue. As De Meyer et al. (2021) point out, the transformative potential of public engagement lies in the concrete knowledge acquired by people of how to act on climate change. They contrast this with approaches relying on the assumption that a certain mental state (knowledge, understanding, awareness, attitude, emotion) is the key to unlocking climate action. In their view, the societal potential of engagement – climate agency – is not related to new identities or novel ways of acting, but rather depends on integrating climate action into personal, professional, and civic forms of agency, and the social roles and identities that people already have.

Moser (2019), in her book chapter on "transformative communication", identifies "fostering generative engagement in building dignified futures for all" as one of the ten tasks that climate communication might take on. She associates engagement with relations among people (rather than between people and the issue of climate change), and with bridging the gulfs between opposing viewpoints. Moser and Pike (2015, p. 114) connect the societal role of public engagement with its potential to minimize public opposition, which often results in costly delays to climate preparedness. In their view, public engagement may also "lead to support for additional action as residents see and experience the tangible benefits of climate adaptation and mitigation efforts, such as improved transit systems, expansion of green space and community gardens, reduction in air pollution, etc." (Moser & Pike, 2015).

Corner and Randall (2011) discuss three alternative approaches in their critique of social marketing as a strategy for public engagement, namely environmental education, value-based engagement, and social networks and social capital. All three involve engaging people at a deeper level (and in a broader capacity) to achieve more than piecemeal changes in pro-environmental behavior. Pearce et al. (2015), in turn, criticize the field of climate communication for its limited view both of the relationships between science and society and of the public. Ockwell et al. (2009) point out how fostering public demand for ambitious climate policies could bridge the divide between approaches that focus on direct regulation (top-down) and voluntary action (bottom-up).

Public engagement and communication

Ballantyne's (2016) literature review on how communication is conceptualized in climate communication research, which inspired this review, was also included in the research material. According to her analysis, research on climate communication is characterized by diverging and incompatible understandings of communication as a theoretical construct. There appears to be "no agreement on what communication means, how it is defined or how it should be used—and many authors do not consider these aspects of communication at all" (Ballantyne, 2016, p. 337). As a remedy, she (2016, p. 332) advocates using the constitutive model of communication as a meta-model to open up a conceptual space in which to reflect on the many different ideas concerning the communication of climate change.

The present review supports Ballantyne's observations concerning research on public engagement with climate change. Most of the articles approach communication as a pragmatic tool for conveying messages, rather than a disciplinary field of scholarship (Ballantyne, 2016, p. 337). The need to develop more efficient communication strategies to overcome the barriers of public engagement is

frequently emphasized. This widely shared objective is perceived not as a specific view of communication, but rather as a general statement concerning the seriousness of climate change.

Only one article in the research material explicitly conceptualizes communication and public engagement vis-à-vis each other. In their commentary on community engagement and adaptation, Moser and Pike (2015, p. 112) define communication as a means of engagement that aims – preferably in a two-way manner – at "better access to, greater interest in, and improved exchange of information, knowledge, opinions and experiences". Engagement, in turn, is defined as an overarching concept that "describes those purposeful deliberation processes of involving the public in matters of public concern and decision-making, in this case climate change, sometimes over an extended period of time" (Moser & Pike, 2015). Aragon et al. (2019, p. 11) echo this approach to communication and engagement in their article on the role of landscape installations in climate change communication. In their view, creative practices in the arts and the humanities could overcome some of the challenges of climate communication by providing new forms of representation and emotive experiences to an expanded public.

Authors other than Ballantyne (2016) also focus on theorizing communication rather than exploring its potential in addressing climate change. These cases typically point out that successful climate communication cannot be based simply on information transfer between communicators and their audiences. Communication efforts should rather focus on including people in the process as interlocutors that define the course and contents of the conversation together with the communicator. However, the tension between this approach and the strategic need to communicate climate change effectively is typically not addressed. Dialogue is included among the diverse means of communicating climate change rather than as a process of signification that – ultimately – defines what climate change is.

Juarez-Bourke (2018) argues for strengthening the normative authority of climate communication in her article on the potential of performative methods. In her view, what is significant is "that we as communicators become more objective with our message, but that our normative authority becomes more explicitly normative and less authoritarian" (Juarez-Bourke, 2018, p. 155). In contrast to persuasive communication methods that easily fall prey to the idea of correcting deficits in knowledge and behavior, performative methods "offer a format, which allows us to re-examine our own values, create new common values, and move forward despite differing values" (Juarez-Bourke, 2018).

The impetus to theorize communication is at the heart of Okoliko and de Wit's (2021) "conceptual reflection on media(ted) climate change communication", which examines public engagement vis-à-vis the concepts of person and community in African political theories. In their view, the transmission model of communication projects a bifurcated view that gives the public a passive role, which has "import for the forms of subjectivity in climate (in)action, including a weakened citizenship representation in climate discourse and the de-pluralization of ideas" (Okoliko & de Wit, 2021, p. 37). To promote more inclusive public engagement, they developed an Afro-relationality-inspired media model for climate communication.

Discussion

This review confirms the impression that communication in the context of climate research is predominantly approached as a pragmatic tool to be used in addressing climate change (Ballantyne, 2016). Communication is typically approached in the literature as a means of strengthening public engagement with climate change. The review also supports the more general concern that public engagement has become a catch-all term with so many meanings that it is on the verge of becoming meaningless (Berger, 2009; Rowe & Frewer, 2005). The majority of the reviewed articles use the term public engagement without defining it at all. Public engagement is typically considered a psychological phenomenon that is assumed to have a central role in achieving the necessary societal change to address climate change – but how this happens is rarely elaborated (cf. Carvalho et al.,

2017, p. 124). With only a hint of exaggeration, the predominant approach could be summarized thus: whatever public engagement with climate change means we should use communication to increase it as much as we can (cf. Berger, 2009, p. 5).

This review raises a question concerning the identity of climate communication as a research field. Should such research be more than a science of effective communication? This question relates to similar introspection in the field of environmental communication concerning whether it should be a mission-oriented crisis discipline (Cox, 2007) or a reflexive discipline of and about crisis (Schwarze, 2007) (for an analysis of this discussion, see Stephens, 2018, pp. 1–39). The present review is based on the premise that more reflexive orientation towards effectively communicating climate change would strengthen climate communication research as an academic discipline. More specifically, the aim was to find room for sociologically oriented research on climate communication that would approach public engagement and communication as social forces that are not reducible to the intentions of climate communicators or to the observed changes in individual attitudes and behaviors.

The research on climate communication reviewed for this article approaches the problematic of public engagement, communication, and societal change predominantly from a psychological perspective emphasizing individual engagement as the driver of systemic change. The processes that connect individual engagement to the societal change needed to address climate change appear as a black box in much of the literature. Implicitly, such work appears to rely on the ABC model, according to which societal change depends on values and attitudes (A), which are believed to drive the kinds of behavior (B) that individuals choose (C) to adopt (Shove, 2010).

Cultivating sociological imagination in the research on climate communication does not mean denying the importance of effective communication that approaches engagement as a psychological phenomenon. This has been (and will undoubtedly continue to be) a highly useful approach. The concept of public engagement has been systematically described as a psychological construct, which directly links with behaviors that may help mitigate climate change. Empirical studies within this framework have attested to the social relevance of climate communication research. The notion of effective communication, in turn, is useful as a nodal point that connects diverging disciplinary perspectives on the different elements of the communication process. The question of effectively communicating climate change conveniently brings together research on the senders, mediums, receivers, contents, and possible interferences of the communication. Although communicating climate change with the goal of fostering individual engagement and behavior change undoubtedly continues to be the crux of the research, this review underscores the need to complement such an approach with sociological and social-theoretical insights into how climate communication functions as a social force.

Detailed work related to personal engagement is weakly connected to research on the social dimensions of public engagement (Höppner & Whitmarsh, 2011, p. 49). The first task for sociologically oriented research on climate communication is to explicate the relations between the private–psychological and social dimensions of engagement (for an example of this kind of work, see Whitmarsh et al., 2013). Public engagement with climate change connotes a combination of activity and attention towards combatting the issue, which most people would wish to promote in some capacity (c.f., Berger, 2009, p. 341). It is a question of how this combination of increasing attention and activity could gain systemic relevance.

The second research task is to develop theories and concepts related to the social dimension of public engagement in a way that makes them empirically applicable. There are several possible directions for this kind of work. Political engagement with climate change has already been identified as a potential research agenda for climate communication research (Carvalho et al., 2017). There is also a rich stream of research on civic engagement through participation in democratic decision-making and an orientation towards collective problem-solving (e.g. Blue, 2017; Rask & Worthington, 2018). Another potential starting point is to differentiate between political, social, and moral engagement with climate change as different forms of directing attention and activities in the public realm (cf. Berger, 2009).

The third task for those conducting sociologically oriented research on climate communication is to approach the notion of effective communication as a particular model of communication to be contrasted with other models. This is not to deny the value of climate-communication strategies aimed at increasing public engagement with climate change. It rather entails acknowledging that the societal significance of communication is much more complex than the basic elements of its planning – sender, message, media, audience, and effect – convey. The idea of communication as a constitutive process that produces and reproduces meanings could be used as a meta-model to open up a conceptual space in which effective communication and other notions and models of climate communication could interact. (Ballantyne, 2016; Craig, 1999.)

Some of the work reviewed in this article takes steps forward in terms of exploring how public engagement changes society beyond individual behavioral change and participation in democratic decision-making (e.g. Ockwell et al., 2009). The reviewed material also includes isolated attempts to problematize some aspect of the prevalent strategic approach that focuses on individual engagement and effective communication (Ballantyne (2016), Cornell and Randall (2011), Wibeck (2014), Juárez-Bourke (2018), Pearce et al. (2015) and Okoliko and de Wit (2021), and others). What is clearly missing is a discussion aimed at connecting these initiatives and critiques to the more general idea of sociologically oriented research on climate communication and pushing future work in that direction.

This is not the place for a detailed exposition of the potential theoretical, conceptual, and empirical directions for sociologically oriented research on climate communication – a brief example of the kind of approach that is missing in the literature will suffice. One thought-provoking starting point for sociologically oriented research concerning public engagement with climate change is a theory of ecological communication that focuses on the limits of public engagement as a societal force (Luhmann, 1989).[3] Taking the limits of public engagement rather than its potential as a theoretical starting point would be illuminating because it forces one to focus in explicating how public engagement manages to change the way society responds to the threat of climate change. From this perspective, the societal consequences of climate communication and public engagement constitute an empirical question that calls for detailed analysis of their assumption of relevance in different social systems, including the economy, law, science, the mass media, education, art, and religion. The complex interdependency among these systems defines the societal relevance of climate communication and public engagement as a force of societal change.

Empirical research on climate communication within this framework would focus on the question of why and how such communication generates resonance and reaction in these societal subsystems (cf., Konold & Schwietring, 2021, p. 136). An interesting and timely focal point for this kind of research would be the phenomenon of sustainable investment that has assumed popularity resulting in a vast and richly diverse global movement (Daugaard, 2020, p. 1502). Public engagement with climate change increases the demand for investment opportunities that would be profitable and would contribute to its mitigation and adaptation to it. Discourse analysis would focus on how the integration of profitability and mitigation is achieved in the marketing of sustainable investment products, for example. Structural analyses would consider and theorize climate communication and public engagement as systemic phenomena. In the case of sustainable investment, this means asking two questions. On the one hand, how does public engagement – namely the direction of attention and activities towards the economic system resulting in increased demand for sustainable investment opportunities – change the economic system? On the other hand, what sustainable investment or sustainable economy means from the perspective of other systems and other forms of climate communication such as climate politics, climate science, and climate education?

Notes

1. Following common usage in climate communication research, the term "public engagement with climate change" is favored in this article. "Public engagement in climate change", "public engagement with the

issue of climate change" or "climate engagement" are also used. See Berger (2009, pp. 340–341) for a discussion of the different senses that "engage with", "engage in", and "being engaged by" imply. These different senses are only rarely reflected upon and have thus not become properly differentiated in research concerning public, civic and other forms of engagement. (Berger, 2009, pp. 340–341.)

2. See e.g., Ho et al. (2017). Ballantyne (2016) reviewed the field from the perspective of communication theory. Other reviews include Moser (2010; 2016), Pearce et al. (2015), Nerlich et al. (2010), and Wibeck (2014)

3. Neither Niklas Luhmann's systems theory nor his (1989) theoretically ambitious study of ecological communication have received significant attention in the fields of environmental communication or in the research on climate communication (Mathur, 2005; Miller, 2021). This is not to claim that Luhmann's theory would be the only plausible framework for sociologically imaginative research on climate communication. The point is rather that his work is a theoretically ambitious, heuristically useful, and underutilized starting point for climate communication research.

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