

Advance paper submitted to the
IPCC Expert Meeting on Communication, Oslo, 9-10 February 2016

List of IPCC and climate change communications research

This list is a compilation of academic papers and books that are relevant as background reading for the IPCC Expert Meeting on Communications in Oslo, Feb. 9-10, 2016. This is by no means an attempt to make a complete list, and references may be somewhat arbitrary. It is compiled by CICERO Center for International Climate and Environmental Research and The Norwegian Environment Agency. We encourage suggestions from anyone on additional references. Suggestions can be e-mailed to espen.larsen@miljodir.no and will be added to the list after the Oslo meeting.

The Psychology of Climate Change Communications *Center for Research on Environmental Decisions* (2009)

Relevant results/main content: A Guide for Scientists, Journalists, Educators, Political Aides, and the Interested Public.

http://guide.cred.columbia.edu/pdfs/CREdguide_full-res.pdf

Guide: Managing the Psychological Distance of Climate Change *Climate Outreach & Information Network*. (2015)

There is a lot of research to support the idea that reducing the psychological distance of climate change is important, but this guide explains why it may not be as straightforward as focusing on 'local' rather than 'global' aspects of the issue.

<http://climateoutreach.org/resources/psychological-distance/>

Guide: Communicating Climate Change Uncertainty *Climate Outreach & Information Network*. (2015)

Relevant results/main content: This guide complements and builds on the Uncertainty Handbook written by Climate Outreach and the University of Bristol. It lays out how to talk about uncertainty in climate science and deal with scepticism.

<http://climateoutreach.org/resources/guide-communicating-climate-change-uncertainty/>

Uncertainty and the IPCC – based on Climate Change special issue

A summary by COIN on the Climate Change special issue on IPCC communications of uncertainty. Some of the papers in this special edition are oriented very specifically at the IPCC itself. Others discuss theoretical notions of 'uncertainty', 'consensus', or 'ignorance' in a lot of technical detail. But some are of wider interest for those involved in communicating uncertainty in climate science beyond the processes of the IPCC.

<http://talkingclimate.org/wp-content/uploads/2011/10/Uncertainty-the-IPCC.pdf>

Effective communication of uncertainty in the IPCC reports David V. Budescu, Han-Hui Por, Stephen B. Broomell *Climatic Change* Volume 113, Issue 2, pp 181-200 (2012)

Relevant results/main content: Study shows that the public consistently misinterprets the probabilistic statements in the IPCC report in a regressive fashion, and that there are large individual differences in the interpretation of these statements, which are associated with the respondents' ideology and their views and beliefs about climate change issues. Most importantly our results suggest that using a dual (verbal—numerical) scale would be superior to the current mode of communication as it (a) increases the level of differentiation between the various terms, (b) increases the consistency of interpretation of these terms, and (c) increases the level of consistency with the IPCC guidelines. Most importantly, these positive effects are independent of the respondents' ideological and environmental views.

<http://link.springer.com/article/10.1007/s10584-011-0330-3>

Poles Apart? The Social Construction of Responsibility for Climate Change in Australia and Norway

Eckersley, R. *Australian Journal of Politics and History*, 59, 382–396. (2013)

This article provides a comparative discourse analysis of the climate responsibility narratives of Australian and Norwegian political leaders during the period 2007–2012. The analysis focuses on how political leaders imagine their country's identity and role in the world and how they connect (or disconnect) these identities, roles and interests with responsibility for climate change, and with their respective energy policies. The analysis shows that the striking differences in mitigation ambition and responsibility discourses between Australia and Norway are clearly related, but cannot be reduced, to differences in their relative dependence on fossil fuel. Rather, differences in national identity and international role conception provide a far more illuminating account than a simple interest-based explanation. However, Australia and Norway are not quite so “poles apart” on their energy policies, and I briefly explore the implications of climate policy hypocrisy.

<http://onlinelibrary.wiley.com/doi/10.1111/ajph.12022/abstract>

Personally Relevant Climate Change. The Role of Place Attachment and Local Versus Global

Message Framing in Engagement Scannell, L. and R. Gifford *Environment and Behavior* (45): 60-85 (2013)

To help mitigate the negative effects of climate change, citizens' attitudes and behaviors must be better understood. However, little is known about which factors predict engagement with climate change, and which messaging strategies are most effective. A community sample of 324 residents from three regions in British Columbia read information either about a climate change impact relevant to their local area, a more global one, or, in a control condition, no message. Participants indicated the extent of their climate change engagement, the strength of their attachment to their local area, and demographic information. Three significant unique predictors of climate change engagement emerged: place attachment, receiving the local message, and gender (female). These results provide empirical support for some previously proposed barriers to climate action and suggest guidelines for effective climate change communication.

<http://eab.sagepub.com/content/early/2011/10/20/0013916511421196.abstract>

Framing and communicating climate change: the effects of distance and outcome manipulations

Spence, A. and Pidgeon, N. *Global Environmental Change* 20: 656-667 (2010)

Communications regarding climate change are increasingly being utilised in order to encourage sustainable behaviour and the way that these are framed can significantly alter the impact that they have on the recipient. This experimental study seeks to investigate how transferable existing research findings on framing from health and behavioural research are to the climate change case.

The study (N = 161) examined how framing the same information about climate change in terms of gain or loss outcomes and in terms of local or distant impacts can affect perceptions. Text on potential climate change impacts was adapted from the 2007 Intergovernmental Panel on Climate Change report, alongside maps and images of potential flooding impacts. Participants then completed measures of various relevant socio-cognitive factors and questions assessing their responses to the information that they had received. Results indicated that, ceteris paribus, gain frames were superior to loss frames in increasing positive attitudes towards climate change mitigation, and also increased the perceived severity of climate change impacts. However, third variable analyses demonstrated that the superiority of the gain frame was partially suppressed by lower fear responses and poorer information recall within gain framed information. In addition, framing climate change impacts as distant (whilst keeping information presented the same) resulted in climate change impacts being perceived as more severe, whilst attitudes towards climate change mitigation were more positive when participants were asked to consider social rather than personal aspects of climate change. Implications for designing communications about climate change are outlined.

<http://www.sciencedirect.com/science/article/pii/S0959378010000610>

Fear won't do it. Promoting positive engagement with climate change through visual and iconic representations (2009) O'Neill, S. & Nicholson-Cole, S. *Science communication* vol. 30 nr 3: 355-379.

Fear-inducing representations of climate change are widely employed in the public domain. However, there is a lack of clarity in the literature about the impacts that fearful messages in climate change communications have on people's senses of engagement with the issue and associated implications for public engagement strategies. Some literature suggests that using fearful representations of climate change may be counterproductive. The authors explore this assertion in the context of two empirical studies that investigated the role of visual, and iconic, representations of climate change for public engagement respectively. Results demonstrate that although such representations have much potential for attracting people's attention to climate change, fear is generally an ineffective tool for motivating genuine personal engagement. Nonthreatening imagery and icons that link to individuals' everyday emotions and concerns in the context of this macro-environmental issue tend to be the most engaging. Recommendations for constructively engaging individuals with climate change are given.

<http://scx.sagepub.com/content/30/3/355.short>

Explaining topic prevalence in answers to open-ended survey questions about climate change

Tvinnereim, E. & Fløttum, K. *Nature Climate Change* 5, 744–747 (2015)

Citizens' opinions are crucial for action on climate change, but are, owing to the complexity of the issue, diverse and potentially unformed¹. We contribute to the understanding of public views on climate change and to knowledge needed by decision-makers by using a new approach to analyse answers to the open survey question 'what comes to mind when you hear the words 'climate change''?. We apply automated text analysis, specifically structural topic modelling², which induces distinct topics based on the relative frequencies of the words used in 2,115 responses. From these data, originating from the new, nationally representative Norwegian Citizen Panel, four distinct topics emerge: Weather/Ice, Future/Impact, Money/Consumption and Attribution. We find that Norwegians emphasize societal aspects of climate change more than do respondents in previous US and UK studies^{3, 4, 5, 6}. Furthermore, variables that explain variation in closed questions, such as gender and education, yield different and surprising results when employed to explain variation in what respondents emphasize. Finally, the sharp distinction between scepticism and acceptance of

conventional climate science, often seen in previous studies, blurs in many textual responses as scepticism frequently turns into ambivalence.

<http://www.nature.com/nclimate/journal/v5/n8/full/nclimate2663.html>

Disaster, uncertainty, opportunity or risk? Key messages from the television coverage of the IPCC's 2013/2014 reports Painter, J. *Mètode Science Studies Journal* (2015)

This article examines the television coverage of the three 2013 and 2014 reports by the Working Groups of the IPCC in five European countries: Germany, Norway, Poland, Spain and the United Kingdom. The presence, salience and dominance of four frames (disaster, uncertainty, explicit risk and opportunity) were examined in each of the bulletins monitored. The «disaster» frame was the strongest of all the frames, measured by all three metrics. «Opportunity» was the next most present, followed by «uncertainty». Although the IPCC put considerable emphasis on a risk management approach to tackling climate change in its communication of the WG2 report, the «explicit risk» frame was hardly present. The UK stood out for including some coverage of sceptical viewpoints.

<https://ojs.uv.es/index.php/Metode/article/view/4179>

Apocalypse soon? Dire Messages Reduce Belief in Global Warming by Contradicting Just-World beliefs Feinberger, M. & Willer, R. *Psychological Science* 2011 22: 34. (2011)

Though scientific evidence for the existence of global warming continues to mount, in the United States and other countries belief in global warming has stagnated or even decreased in recent years. One possible explanation for this pattern is that information about the potentially dire consequences of global warming threatens deeply held beliefs that the world is just, orderly, and stable. Individuals overcome this threat by denying or discounting the existence of global warming, and this process ultimately results in decreased willingness to counteract climate change. Two experiments provide support for this explanation of the dynamics of belief in global warming, suggesting that less dire messaging could be more effective for promoting public understanding of climate-change research.

http://www.climateaccess.org/sites/default/files/Feinberg_Apocalypse%20Soon.pdf

Think global, act local? The relevance of place attachment and place identities in a climate changed world Devine-Wright, P. *Global Environmental Change* 23: 61-69. (2013)

Place attachments and place identities have been overlooked by research into human aspects of climate change. Place attachments and identities are relevant for understanding climate adaptation, mitigation and risk communication. Despite a prevalent localism, the focus on place attachment should encompass global as well as other scales. Future research can examine how global place attachments are associated with environmental worldviews and values. This research agenda can inform research on practical initiatives that seek to engage publics about climate change.

<http://www.sciencedirect.com/science/article/pii/S0959378012001100>

No more summaries for wonks Richard Black *Nature Climate Change* 5, 282–284 (2015)

IPCC assessments present an unparalleled opportunity for climate science to speak directly to power. Re-thinking the summaries written for policymakers would enable scientists to communicate far more effectively with political leaders and the public.

<http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2534.html>

The IPCC in an age of social media Leo Hickman *Nature Climate Change* 5, 284–286 (2015)

How should the IPCC communicate its findings, not just to policymakers, but to a wider audience? In today's online environment, readers demand an open and transparent interaction, but the responses must be both rapid and authoritative. As the IPCC debates its future, it must be bold in engaging with social media.

<http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2528.html>

Taking a bet on risk James Painter *Nature Climate Change* 5, 286–288 (2015)

In the light of its potential benefits, some scientists have been using the concept of risk to frame their discussions of climate change. At the moment, the media hardly pick up on risk language, so can anything be done to encourage them?

<http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2542.html>

Media power and climate change Julia B. Corbett *Nature Climate Change* 5, 288–290 (2015)

Fingers are often pointed directly at the news media for their powerful influence and ineffective reporting of climate change. But is that the best place to point? And are there more effective ways to conceptualize the power of the media and to consider whom they serve?

<http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2592.html>

Dominant frames in legacy and social media coverage of the IPCC Fifth Assessment Report Saffron O'Neill, Hywel T. P. Williams, Tim Kurz, Bouke Wiersma & Maxwell Boykoff *Nature Climate Change* 5, 380–385 (2015)

The media are powerful agents that translate information across the science–policy interface, framing it for audiences. Yet frames are never neutral: they define an issue, identify causes, make moral judgements and shape proposed solutions. Here, we show how the IPCC Fifth Assessment Report (AR5) was framed in UK and US broadcast and print coverage, and on Twitter. Coverage of IPCC Working Group I (WGI) was contested and politicized, employing the 'Settled Science, Uncertain Science, Political or Ideological Struggle and Role of Science' frames. WGII coverage commonly used Disaster or Security. More diverse frames were employed for WGII and WGIII, including Economics and Morality and Ethics. Framing also varied by media institution: for example, the BBC used Uncertain Science, whereas Channel 4 did not. Coverage varied by working group, with WGIII gaining far less coverage than WGI or WGII. We suggest that media coverage and framing of AR5 was influenced by its sequential three-part structure and by the availability of accessible narratives and visuals. We recommend that these communication lessons be applied to future climate science reports.

<http://www.nature.com/nclimate/journal/v5/n4/full/nclimate2535.html>

Science and Stories: Bringing the IPCC to Life Corner, A., & van Eck, C. *Climate Outreach & Information Network*. (2014)

In this report we ask what would the IPCC process be like if it was designed to catalyse a political and public response proportionate to the scale of the climate change challenge? Our suggestions are based on interviews with 16 leading climate change communication experts from the media and NGOs in the UK and combined with the latest climate communication research understandings

<http://climateoutreach.org/science-stories-bringing-the-ipcc-to-life/>

Actionable knowledge for environmental decision making: Broadening the usability of climate science Kirchhoff, C. J., Lemos, M. C., & Dessai, S. *Annual Review of Environment and Resources*, 38(1), 393. (2013)

Despite the rapid evolution and growing complexity in models of science-society interaction, the rate and breadth of use of scientific knowledge in environmental decision making, especially related to climate variability and change, remain below expectations. This suggests a persistent gap between production and use that, to date, efforts to rethink and restructure science production have not been able to surmount. We review different models of science-policy interfaces to understand how they have influenced the organization of knowledge production and application. We then explore how new approaches to the creation of knowledge have emerged, involving both growing integration across disciplines and greater interaction with users. Finally, we review climate information use in the United States and United Kingdom to explore how the structure of knowledge production and the characteristics of users and their decision environments expose the challenges of broadening usable climate science.

<http://www.annualreviews.org/doi/full/10.1146/annurev-environ-022112-112828>

Formalization and Separation: A Systematic Basis for Interpreting Approaches to Summarizing Science for Climate Policy Sundqvist, Göran, Bohlin, Ingemar, Hermansen, Erlend A.T., & Yearley, Steven *Social Studies of Science* 45(3): 416-440. (2015)

In studies of environmental issues, the question of how to establish a productive interplay between science and policy is widely debated, especially in relation to climate change. The aim of this article is to advance this discussion and contribute to a better understanding of how science is summarized for policy purposes by bringing together two academic discussions that usually take place in parallel: the question of how to deal with *formalization* (structuring the procedures for assessing and summarizing research, e.g. by protocols) and *separation* (maintaining a boundary between science and policy in processes of synthesizing science for policy). Combining the two dimensions, we draw a diagram onto which different initiatives can be mapped. A high degree of formalization and separation are key components of the canonical image of scientific practice. Influential Science and Technology Studies analysts, however, are well known for their critiques of attempts at separation and formalization. Three examples that summarize research for policy purposes are presented and mapped onto the diagram: the Intergovernmental Panel on Climate Change, the European Union's Science for Environment Policy initiative, and the UK Committee on Climate Change. These examples bring out salient differences concerning how formalization and separation are dealt with. Discussing the space opened up by the diagram, as well as the limitations of the attraction to its endpoints, we argue that policy analyses, including much Science and Technology Studies work, are in need of a more nuanced understanding of the two crucial dimensions of formalization and separation. Accordingly, two analytical claims are presented, concerning *trajectories*, how organizations represented in the diagram move over time, and *mismatches*, how organizations fail to handle the two dimensions well in practice.

<http://sss.sagepub.com/content/45/3/416.abstract>

Climate Science Reconsidered Rapley, Chris and De Meyer, Kris *Nature Climate Change* 4: 745-746. (2014)

There is a gap between the current role of the climate science community and the needs of society. Closing this gap represents a necessary but insufficient step towards improved public discourse and more constructive policy formulation on climate change.

<http://www.nature.com/nclimate/journal/v4/n9/full/nclimate2352.html>

Narrowing the Climate Information Usability Gap Lemos, Maria Carmen, Kirchhoff, Christine J. and Ramprasad, V. *Nature Climate Change* 2: 789-794. (2012)

Climate-change-related risks pose serious threats to the management of a wide range of social, economic and ecological systems. Managing these risks requires knowledge-intensive adaptive management and policy-making actively informed by scientific knowledge, especially climate science¹. However, potentially useful climate information often goes unused^{1, 2}. This suggests a gap between what scientists understand as useful information and what users recognize as usable in their decision-making. We propose a dynamic conceptual model to address this gap and highlight strategies to move information from useful to usable to reduce climate-related risks.

<http://www.nature.com/nclimate/journal/v2/n11/full/nclimate1614.html>

Breaking the Climate Change Communication Deadlock Corner, Adam and Groves, Christopher *Nature Climate Change* 4: 743-745. (2014)

Climate change communication is trapped between the norms that govern scientific practice and the need to engage the public. Overcoming this tension requires new societal institutions where the science and politics of climate change can co-exist.

<http://www.nature.com/nclimate/journal/v4/n9/full/nclimate2348.html>

Time for change? Climate Science Reconsidered UCL Policy Commission on Communicating Climate Science

The UCL Policy Commission on the Communication of Climate Science, chaired by Professor Chris Rapley comprises a cross-disciplinary project group of researchers from psychology, neuroscience, science and technology studies, earth sciences and energy research. The Commission examined the challenges faced in communicating climate science effectively to policy-makers and the public, and the role of climate scientists in communication.

https://www.ucl.ac.uk/public-policy/policy_commissions/Communication-climate-science

Synthesizing a Policy-Relevant Perspective from the Three IPCC “Worlds” – a comparison of topics and frames in the SPMs of the Fifth Assessment Report Kjersti Fløttum, Des Gasper, Asuncion Lera St.Clair *Global Environmental Change*, Submitted January 12, 2016

The paper investigates topics, emphases, frames and absences in the Summary for Policymakers (SPM) parts of the three Working Group (WG) reports in the IPCC 5th Assessment Report (AR5) and the SPM of the Synthesis Report (SYR). It explores similarities and differences by using various tools of lexical and discourse analysis, combining quantitative and qualitative methods. The main results are these: First, each WG’s SPM reflects not only the WG’s distinctive mandate but also a distinctive intellectual framing. Second, although there are some significant differences in the emphases given to different themes from the WGs, the SYR-SPM covers the main topics of the three other SPMs, and constitutes a relatively integrated summary of the complete assessment report. In addition, third, we find though that the SYR SPM centrally follows up the risk framing and language which are prominent in WGII but semi-absent in the other WGs, as part of constructing a policy-relevant statement from

the three distinctive reports. In addition, the SYR SPM makes use of linguistic devices which contribute to 'amplify' the strength of statements, as part of transferring messages effectively from the scientific context to a policy-maker audience. Fourth, we find that the style and tone of the IPCC SPMs conduce also to important absences and imbalances in emphasis: main victims of climate change (particular groups of vulnerable people) remain virtually invisible in the SPMs, unlike the impacts in nature and ecological systems or the aggregate economic impacts, and correspondingly the challenges, options and opportunities for action remain relatively underdeveloped in the analysis.

The unseen uncertainties in climate change: reviewing comprehension of an IPCC scenario graph

Climatic Change, November 2015

One of the most discussed and widely distributed visual in the Intergovernmental Panel on Climate Change (IPCC) report is the graph, showing the global surface temperature evolution for the 21st century as simulated by climate models for various emission scenarios, which is part of the Summary for Policymakers (SPM) and the Working Group I contribution to the Fourth Assessment Report (AR4). It displays two types of uncertainties, namely the socio-economic scenarios and response uncertainty due to imperfect knowledge and models. It was found that novice readers were unable to identify the two different types of uncertainties shown in this graph without substantial guidance. Instead they saw a great deal of uncertainty but falsely attributed it to the climate model(s) and ignored the scenario uncertainties. Our findings demonstrate how the choice of display can directly impact a reader's perception of the scientific message, which could inevitably impede its value as a decision support tool.

<http://link.springer.com/article/10.1007/s10584-015-1473-4>

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