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Annotated Bibliography

Writing for the Sciences

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Anthropogenic climate change is a global issue of the utmost urgency. As our planet's climate warms at a rapid pace, swift and efficient mitigation is needed, and this work may only be done when people believe in the reality of this issue. With many doubting the validity of climate science and conspiracy theories running rampant, this annotated bibliography highlights the need to analyze and examine how we talk about climate change in order to improve our communication and diminish disbelief. In reviewing the following sources, we ask ourselves: how can we use rhetorical strategies to combat anthropogenic climate change skepticism? In answering this question, we drew sources from a series of academic disciplines including Earth science, politics, economics, rhetoric, and conspiracy theories. By reviewing the issue from an intersectional lens, we believe that we may take into account the multitude of variables that impact an individual's understanding of climate change in order to determine how we may best convey the reality and significance of this issue.

1. Badullovich, N., Grant, W.J., & Colvin, R.M. (2020). Framing climate change for

effective communication: A systematic map. *Environmental Research Letters*

15(12). DOI: 10.1088/1748-9326/aba4c7

This analysis targets climate change as an issue of communication, where framing is an important technique in which writers may emphasize certain elements of the issue over others in order to shape how climate change is understood by the listener. The goal of the piece is to analyze the ways in which framing may be used to implement effective climate change communication in public forums. They present their synthesis in the form of a systemic map that includes 274 articles from 281 studies. They find that the most common frames include scientific, economic, and environmental, and that climate change frames differ in efficiency depending on country and socio-political context. They conclude their piece with the statement that research must be reflexive in its approach to understanding how the framing of climate change may impact understanding.

The piece approaches a specific method of climate change communication and the ways in which it both increases and decreases an individual's understanding of climate change and why. It further addresses how climate communication interventions may be used to bridge current knowledge and research gaps.

2. Balbe, A.D. & Carvalho, A. (2017). Climate change in Twitter: The prevalence of media and politics. *Desenvolvimento E Meio Ambiente* 40, 141-161.

This article analyzes online communications regarding climate change, specifically in connection with the 21st Conference of Parties of the United Nations Framework Convention on Climate Change where global leaders discussed greenhouse gas emission mitigation strategies. The researchers lay particular emphasis on Twitter, where media platforms such as this impact public debate on climate change while also providing a meaningful look into public opinion and perception of climate change. They seek to answer the questions: which modes of content are most popular? What kind of language is used to discuss climate change? Who is most influential in these discussions? They find that politicians have great influence on public perception of climate change and that social media is a very influential source of information and opinion.

This piece lends focus to a particular area of study that has a significant influence in the dissemination of climate change opinion, information, and skepticism. The information here may be used to analyze how climate change skepticism is created and spread through social platforms, and thus how to identify and combat these communication issues.

3. Besel, R. (2012). Prolepsis and the environmental rhetoric of congressional politics:

Defeating the climate stewardship acts of 2003. *Environmental Communication:*

*A Journal of Nature and Culture* 6(2), 233-249. DOI:

10.1080/17524032.2012.666985

In this analysis, the researchers examine prolepsis as a device of “argumentative anticipation” in being a rhetorical strategy used to communicate climate issues. They lend focus on the Climate Stewardship Act of 2003 in connection with environmental communication, political argumentation, and rhetorical theory.

They question prolepsis as a source of misunderstanding that can generate confusion and denial of climate change when used as a source of invention and connect this question with the proleptic arguments used in the Climate Stewardship Act, which they argue downplayed the economic arguments against the Act. As a result, the miscalculations were strengthened by US senators.

In their conclusion, the researchers discuss the potential of this issue within scholarly understanding of climate change communication. They encourage the analysis of prolepsis use in policy making and offer a series of solutions for improving communication in future environmental legislation

4. Bolsen, T., Palm, R., & Kingsland, J.T. (2021). Effects of conspiracy rhetoric on views about the consequences of climate change and support for direct carbon capture.

*Environmental Communication: A Journal of Nature and Culture*. DOI:

10.1080/17524032.2021.1991967

This study used two survey-based experiments in order to test the impact of conspiracy rhetoric on public perception of climate change in the US in connection with support for direct carbon capture. The first study examines the participants' reception of a scientific report on the impacts of climate change when paired with conspiracy-based criticism of the study's conclusions. The second study explores conspiracy rhetoric criticizing a study that supports the use of direct carbon capture as a climate change mitigation strategy. The researchers found that conspiracy theories undoubtedly impact the public's understanding of climate change, discouraging support for mitigation and instead encouraging skepticism of the issue in its entirety.

The analysis lends focus on the rhetorical strategies used to communicate climate change conspiracy theories and how these strategies impact public perception in tangible scenarios.

5. Dryzek, J.S. (2015). Reason and rhetoric in climate communication. *Environmental*

*Politics* 24(1), 1-16. DOI: 10.1080/09644016.2014.961273

This article analyzes the ways in which rhetoric can facilitate action on whether and how to go about confronting climate change. This study focused on a small group of individuals who strongly believe in the falsity of climate change. The

researchers illustrate how using rhetoric tailored to reaching those who do not share the speaker's perspective may be used to convince deniers and others into climate change acceptance.

Specifically, the study convinced participants of the validity of greenhouse-gas mitigation strategies within adequate policy options, even while deniers maintained the inexistence of anthropogenic climate change. The evidence from this study thus suggests that rhetorical bridges may be effective methods in facilitating diverse public debates on climate change.

6. Hamblyn, R. (2009). The whistleblower and the canary: Rhetorical constructions of climate change. *Journal of Historical Geography* 35(2), 223-236. DOI:

10.1016/j.jhg.2008.09.006

This study aims to examine the historical dimensions of modern debates on climate change, arguing that this history has, in itself, become a crucial element of the rhetorical account. It finds that key historic moments of public revelations are important to how climate change is communicated and argued as both scientific fact and narrative today. It approaches the background of these moments throughout climate science history, hoping to shape rhetorical elements of the current and future debate.

Similar to other sources in this analysis, the researchers focus on a particular area of climate change communication in order to contribute to the greater whole of understanding how miscommunication occurs and how to mitigate climate change skepticism.

7. Hanson-Easey, S. et al. (2015). Speaking of climate change: A discursive analysis of lay understandings. *Science Communication*, 37(2), 217-239. DOI:

10.1177/1075547014568418

This study aims to analyze representations of climate change in media and political domains through an interdisciplinary, historical analysis. They focus specifically on communication strategies and rhetoric used by "lay people" and approach the topic as a social issue contingent on social, financial, and political factors. They further analyze this as an intergenerational issue, considering morality in mobilizing arguments for the importance of climate change. As a

result, the researchers argue that science communication and research has the potential to identify the discursive foundation of talking about climate change, thus giving rise to alternative modes of rhetoric and discourse.

This source tackles climate change communication in connection with public perception of the issue, aiming to analyze how climate change is talked about by normal individuals in the US and consequently how communication can be improved in order to stress the significance and urgency of climate change.

8. Janko, F. et al. (2020). Recalculating climate change consensus: The question of

position and rhetoric. *Journal of Cleaner Production*, 254. DOI:

10.1016/j.jclepro.2020.120127

This paper seeks to quantify the consensus on anthropogenic climate change in connection to its communication strategies. In using a reference list from a climate denier report in conjunction with a previously published quantitative method of consensus research, the authors examine the theoretical and methodological questions of how the climate change crisis is and isn't properly communicated and why.

The results of their analysis revealed the biased nature of the literature examined as well as a significant endorsement of anthropogenic global warming among journal articles that tackle the subject. The authors lay emphasis on the role of "no position abstracts" and the role of rhetoric within these abstracts. They found that rhetoric is of great importance at the level of scientists who must present information with an objective tone as well as readers and editors who must re-interpret climate change texts for others. Therefore, they find that disagreement in climate change positions are a result of the disparate understanding and rhetorically supported interpretation of scientific data. In conjunction with this conclusion is the idea that neutral papers and abstracts have a tendency to provide greater objectivity and room for personal interpretation.

9. Janko, F. et al. (2020). Sources of doubt: actors, forums, and language of climate

change skepticism. *Scientometrics* 124(3), 2251-2277. DOI:

10.1007/s11192-020-03552-z

This study investigates the reference corpus of a climate change contrarian report in order to identify and analyze anti-climate change rhetoric that gives rise to doubt and skepticism. The researchers categorize a series of journal abstracts according to their endorsement positions and then contrast this information through an in-text citation analysis. They lend particular focus to mainstream claims about climate change. Their results reveal moderate differences in endorsement rates and also in the sources of the arguments of study in a more general sense. This supports the idea that diction, syntax, and other rhetorical strategies are just as important as the evidence that backs authors' claims.

The article concludes that doubt about climate change relies on two predominant factors that work together to accomplish their purpose: relevant information based on logical fallacies and findings that do not support mainstream knowledge as well as inserting relevant information into misleading contexts through false interpretations.

10. Medimorec, S. & Pennycook, G. (2015). The language of denial: Text analysis

reveals differences in language use between climate change proponents and skeptics.

*Climatic Change* 133(4), 597-605. DOI: 10.1007/s10584-015-1475-2

The researchers used text analysis to compare the language used in two recent reports on the physical science of climate change, one reported by the Intergovernmental Panel on Climate Change and the other by the Nongovernmental International Panel on Climate Change. Despite both reports being based on ample research within the same scientific discipline, the researchers' rhetoric analyses reveal consistent and substantial differences between the studies. They found that the Intergovernmental Panel used more cautious and conservative diction compared to their skeptical, Nongovernmental counterparts.

This study reveals how political controversies surrounding climate change may cause supporters to use more conservative language for fear of being attacked while critics often use more aggressive language in order to effectively attack the issue. This has clear implications for the communication strategies of scientific rhetoric and climate research.

11. Nerlich, B., Koteyko, N. & Brown, B. (2010). Theory and language of climate change

communication. *Wiley Interdisciplinary Reviews: Climate Change* 1(1), 97-110.

DOI: 10.1002/wcc.002

This interdisciplinary review analyzes the ways in which climate change communication has become a very important topic in science and society, alongside other “communication enterprises” such as health and science communication. The goal of this article is to situate the theory of climate change communication within modern developments in the area of scientific communication, examining the importance as well as difficulties of discussing climate change in various public settings while using a variety of rhetorical tools and strategies. As a result, the researchers provide an overview of theories regarding how best to educate individuals on climate change. They conclude with an analysis on how communication could be improved using the list of theories and strategies outlined in their piece.

This source discusses the importance of climate change communication while also highlighting the difficulties that often arise when communicating the issue, such as skepticism and conspiracies. The researchers focus on the role of language through metaphors, diction, and narratives in order to engage with the relationship between rhetoric and behavior.

12. Poitras, G. (2021). Rhetoric, epistemology and climate change economics.

*Ecological Economics* 184. DOI: 10.1016/j.ecolecon.2021.106985

This analysis explores the epistemological foundations for economic analytics of climate change activism. They argue that climate change is the most significant problem confronting today’s society and seek to analyze the facts, opinions, and theories associated with the research, causes, results, and mitigation of climate change. The researcher supports the importance of rhetoric in activism claims and, following an analysis of historical views on rhetoric, establishes a connection between language and epistemology where rhetoric is concerned.

In performing this analysis, the author proposes a series of strategies in order to properly and effectively communicate climate change issues, derived from models employed by activists.

13. Ruser, A. (2020). A mission for MARS: The success of climate change skeptic

rhetoric in the US. *Res Rhetorica* 7(2), 48. DOI: 10.29107/rr2020.2.4/

14. Tesler, M. (2018). Elite domination of public doubts about climate change (not

evolution). *Political Communication* 35(2), 306-326. DOI:

10.1080/10584609.2017.1380092

This piece examines the sources of ideological doubts concerning both climate change and evolution. They find that conservatives show skepticism regarding climate change, largely due to what the author describes as “elite rhetoric.” The greatest factor that impacts conservative opinions on climate change, they propose, is news-related media despite having little influence on perception of evolution. They further cite three central sources of variation in discourse on climate change: temporal, cross-national, and experimental cues that yield great impacts on public opinion. The researcher also finds that the US is the only country where political interest has significant impacts on climate change perception and skepticism. They conclude with the idea that people would be less likely to doubt climate change if more conservative politicians support the science behind the topic as well as the urgency of the issue.

The author centers their analysis around the sources of public perception of anthropogenic climate change, giving rise to a number of ideas on how to combat misinformation and skepticism through changes in language and sources.

15. Walsh, L. (2017). Understanding the rhetoric of climate science debates. *Wiley*

*Interdisciplinary reviews: Climate Change* 8(3). DOI: 10.1002/wcc.452

This study reveals how scientists and policymakers communicate information and opinion on climate science through rhetorical strategies. The researcher affirms that misunderstandings of climate change are grounded in fundamental issues with historical rhetoric, and that supporters need to employ more rhetorical strategies in order to effectively convey the importance and urgency of climate change. They further call for sensitivity to the political framework within which all climate science debates take place, analyzing how that frame impacts perception and awareness of an individual’s nuanced values and estimations of climate change. The author establishes a link between climate change opinion and stakeholders’ livelihoods, values, and decisions.



This piece provides a brief introduction to the history and use of rhetoric in connection with communication of climate science. This allows readers to develop tools and strategies to mitigate climate debates and communicate accurate, persuasive information.