

ABSTRACT

Title of Dissertation: CAN PHOTOJOURNALISM
ENHANCE PUBLIC ENGAGEMENT
WITH CLIMATE CHANGE?

Joanna Margueritte Nurmis, 2017

Dissertation directed by: Professor Sarah Ann Oates
Philip Merrill College of Journalism

News photographs have the potential to influence public engagement, affecting awareness and attitude, and leading the public not only to be better informed but more emotionally engaged with important issues relating to the common good. News photographs are particularly well suited to communicating about international issues across borders, since they rely on an understanding that may be culturally bound, but does not require discursive interpretation. Alongside war, terrorism, and poverty, climate change is an issue of undeniable scope and import at this threshold “last chance” moment to avoid catastrophic warming – commonly thought of as 2 degrees above historical average temperature. This dissertation asks how photojournalism frames climate change and what potential news images hold for engaging the public with climate change.

The mixed methods approach adopted throughout the thesis allows for a multifaceted view of the visual framing of climate change. After discussing the

current state of research in this burgeoning and highly active field, I investigated a particularly pervasive visual frame, called here “the apocalyptic sublime.” This frame is described in detail, a set of criteria to identify it is provided, and occurrences of it on front pages of national newspapers are discussed. In the second research component, I conducted a series of 14 interviews with Californian and national photo editors yielding insight into the decision-making process that results in the existing visual framing of climate change in newspaper photography as predominantly aesthetics-driven and focusing mainly on the adverse impacts of climate change, rather than the root causes or the possible solutions. Third, I carried out a content analysis of 500 social media shared images of climate change in California, showing that climate change is deeply embedded in people’s everyday lives, and that mitigation behaviors are inextricable from self-promotion. Finally, an experimental study of the effect of certain attributes of climate change news photos was conducted online, with 161 participants. Post-test survey results were partly inconclusive and partly unexpected, calling for more detailed future research into image effects, especially the effects of an “apocalyptic sublime” frame.

The work aims both to decipher the challenges and pitfalls of photographic communication about climate change and to provide a resource for media practitioners who wish to make the most judicious, informed, and context-conscious choices in their use of climate news images. Beyond this particular pressing issue, applications can be found in broader visual communication about issues of public importance.

CAN PHOTOJOURNALISM
ENHANCE PUBLIC ENGAGEMENT WITH CLIMATE CHANGE?

By

Joanna Margueritte Nurmis

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2017

Advisory Committee:

Professor Sarah Ann Oates, Chair

Professor Linda Steiner

Professor Kalyani Chadha

Professor Nathan Hultman, School of Public Policy

Professor Edward Maibach, George Mason University

© Copyright by
Joanna Margueritte Nurmis
2017

Preface

As a political science student, pursuing a master's degree in international relations in Paris, I developed a passion for the role of media in international affairs. My topic of choice raised eyebrows on the Master's committee: I wrote about photographs of war, and specifically, about the choices leading to certain photos being chosen as the best in any given year by two prestigious photojournalism competitions: World Press Photo and Le Prix Bayeux des Correspondants de Guerre. By analyzing trends over time and interviewing former jury members, I found evidence of tendencies, among jury members and competition participants, toward the aesthetization of war and suffering. Yet my professors could not understand why I was looking at pictures. How could pictures contribute anything to our understanding of international relations? Because I focused on images, I was not taken very seriously. The recent wildly viral images of Aylan Kurdi's body washed ashore and Omran Daqneesh sitting stupefied in an ambulance, both child victims of the war in Syria, have reached the consciousness, if not the conscience, of worldwide media audiences who might not otherwise have paid attention to this conflict. In November 2015, New York City Mayor Bill de Blasio held up a printout of the Aylan Kurdi photograph in an impassioned speech targeting those politicians who were reticent to admit refugees to the United States.

My research rests on the idea that the choice of photograph, both in terms of style and content, matters to the way the public conceives of the event – it tells the public how to think of the event, and shapes collective memory of it. Is the war idealized? Is the photo poetic, black and white with a soft focus or excessive grain?

Does it echo a famous painting of the Pietà? Is it beautiful to the point of losing its informative value? These questions kept haunting me as a photo editor intern working for *Agence France-Presse* and later the *International Herald Tribune*, and even as I moved to analyze communication of another global crisis: that of climate change. It turned out that Journalism Studies was a much more hospitable discipline for this inquiry into global communication as occurring through pictures, and I happily made my new scholarly home here.

I continue to believe that, in an image-driven culture, no other medium is as promising a means of communication as photography, especially in the context of global “problems of many hands” such as climate change. What photography can transmit without language is difficult to code, quantify, or categorize. The message conveyed is more powerful than words and at the same time, more elusive. Yet photography has the unique potential to stir emotions, open up the imagination, add information that cannot be conveyed in words, and remain embedded in collective memory in a way that words cannot.

The underlying question which motivated me to write this dissertation is the following: can photography play a role in helping people better understand climate change, become more concerned by it, and more willing to act, or is its role consigned to providing beautiful images witnessing to that which will soon be irrevocably lost?

Dedication

For Ea,
that she may live in a world
where we are moved by what we see
to act on what we know.

Acknowledgements

Above all, I wish to thank Dr. Sarah Oates, my advisor, for being eternally patient and supportive even when it seemed like I was never going to pull this off, and for her invaluable, constructive critique of the dissertation at every stage of its production. I also thank brilliant, inspiring friends in College Park: Micha and Tanya.

I am deeply indebted to Dr. Kalyani Chadha whom I had the privilege of serving as a Graduate Assistant for many semesters: without her mentorship, friendship, and the material support of the assistantship that she offered me, I would not have been able to finish the program. My former employer at The International Herald Tribune, Tala Skari, taught me day after day how to be a better photo editor and helped me contact photo editors to interview for this project.

I also wish to thank colleagues at the International Environmental Communication Association, Adam Corner of Climate Outreach for his advice on the Experiment chapter, Max Wolf for invaluable help with scraping the Instagram API, Bazyli Klockiewicz for help with statistical analysis, the Environmental Humanities Project at Stanford, especially David Stentiford, and the Center for Climate Communication at George Mason University, especially Dr. Ed Maibach.

Finally, none of this would have been achieved without my husband, Kristo, my parents, Bernard and Joanna, godparents Mark and Mary, or my mother-in-law, Helle. They all cheerfully took turns looking after our baby daughter in the months when I had to focus on writing.

My deepest gratitude is due to God - for sustaining me in life and continuing to teach me that striving for good isn't futile.

Statement on Fair Use of Copyright Protected Images in this Thesis

As this dissertation treats of visual communication, it cannot exist without reproducing illustrations that may be subject to copyright. The use of these images in this dissertation has been determined by the author, in concert with the University of Maryland Graduate School, to constitute fair use in each case. The following arguments, based on the fair-use guidelines for theses and dissertations established by the Visual Resources Association¹, apply:

1. The images used (art photographs, news photographs, movie stills, magazine covers, publicly shared Instagram photographs) are always accompanied by significant comment; therefore, their use here is transformative.
2. Wherever possible, the image author or copyright holder is identified in the caption. This does not hold for the Instagram images, which have been anonymized to protect the privacy of users, in case their accounts are now private.
3. None of the images used here are included purely for aesthetic or decorative purposes, but are always as a subject of scholarly argument.
4. The images are reproduced in the smallest possible size and lowest resolution at which their relevant elements can still be identified by the reader, as required by the argument made in each respective case.
5. The circulation and distribution of this thesis will only occur free of charge and for strictly academic or educational purposes, no profit involved.

¹ Visual Resources Association. (2011). Statement on the Fair Use of Images for Teaching, Research and Study. Available at: http://vraweb.org/wp-content/uploads/2011/01/VRA_FairUse_Statement_Pages_Links.pdf [Accessed December 9, 2016]

Table of Contents

Preface.....	ii
Dedication.....	iv
Acknowledgements.....	v
Statement on Fair Use.....	vi
Table of Contents.....	vii
List of Tables.....	x
List of Figures.....	xi
1. Why study climate change photographs?.....	1
1.1. A threshold moment.....	1
1.2. Role of climate journalism.....	3
1.3. Why photographs?.....	7
1.4. Definitions of key terms.....	10
1.5. A mixed method, longitudinal approach to visual framing.....	15
1.6. Outline of the thesis.....	16
2. Can news photographs drive public engagement with climate change?.....	22
2.1 A challenging subject for visual communication.....	22
2.2. The case for analyzing news photographs as a vehicle for public engagement.....	26
The need for more public engagement.....	26
Mass media reporting on climate change.....	27
The role of visual images in public engagement.....	31
2.3. State of the field: visual framing of climate change.....	39
Visual framing theory.....	39
Visual framing of the environment.....	42
Existing visual frames of climate change.....	43
2.4. Challenges of photographic climate change communication.....	46
Missing frames: bad actors, solutions, local impacts.....	46
The salience-efficacy dilemma.....	49
3. From the spectacle of risk, to the risk of spectacle.....	52
3.1. Introduction.....	52
Can a spectacle lead to engagement?.....	52
Spectacular images in environmental communication.....	55
Apocalyptic sublime in popular culture environmental images.....	57
Outline of this chapter.....	60
3.2. Defining an apocalyptic sublime image of climate change.....	60
The origins of the apocalyptic sublime in painting.....	60
Operational criteria for apocalyptic sublime images.....	63
3.3. The sublime apocalyptic aesthetic of climate change in fine art photography.....	65
The flourishing of Anthropocene art.....	65
Engagement with climate change: the artists' goal?.....	66
Close analysis of apocalyptic sublime art photography.....	69
3.4. Page One and the apocalyptic sublime climate photo.....	78
Is the medium itself inherently past-oriented?.....	78
Why apocalyptic sublime images are likely to stall engagement.....	81
Apocalyptic sublime images of climate change on front pages.....	84

3.5. Discussion	88
4. Photo Editors: the gatekeepers of climate change visuals	94
4.1. Introduction	94
Why photo editors?	95
Semi-structured interviews in framing analysis	98
Logistics	99
4.2. Results	102
Tension among time, money, and quality	103
Photographic coverage of climate change: local symptoms only	117
Climate change “symptoms” rarely related to the “disease” itself	118
Photography’s role in the agenda-setting of climate change	124
People are moved by people, local impacts, and photographic evidence of change	128
4.3. Conclusion	134
5. The visual vernacular of climate change in California	142
5.1. Introduction	142
Instagram as a locus of the “visual public sphere”	143
Instagram as a reliable source of visual vernacular	144
The hashtag as a built-in tool for research	151
Relevant studies using the hashtag as a point of entry	152
Research hypotheses	154
5.2. Methodological notes	157
Data collection	157
Associated themes: #globalwarming, #sustainability, #drought	160
Coding scheme	162
Limitations	163
Ethical Considerations	165
5.3. Results	166
5.4. Social semiotic analysis of selected posts	173
Causes	175
Impacts	181
Solutions	188
5.5. Discussion	191
6. How do stills move us? Experimental study of differential image inputs with cause, impact and solution climate change stories	197
6.1. Introduction	197
Hypotheses	202
6.2. Method	203
Experimental 2x3 survey	203
The sample	206
Follow-up qualitative survey	209
The stimuli	209
6.3. Results	216
T-test results from experimental survey	216
Qualitative results from follow-up survey	219
6.4. Discussion	223

6.5. Limitations and future variations	224
7. Conclusion	226
7.1 Executive Summary	226
The current state of visual framing of climate change.....	227
Photo Editors: the gatekeepers of climate images	228
Instagram images reveal existing and new visual frames of climate change ...	232
What leads to higher story understanding and engagement?	233
7.2. Limitations of this research.....	234
7.3 Implications for photojournalism theory	234
7.4 Implications for climate communicators	236
7.5 Future research directions	237
Appendices.....	239
A. Interview guide for photo editor interviews.....	239
B. Coding table for Instagram data.	242
C. Survey questions for each experimental condition	243
Pretest.....	243
Posttest.....	244
D. Debriefing survey questions.....	245
Bibliography	246

List of Tables

Table 2.1. Themes detected in climate change news photos by recent literature.	45
Table 4.1. Organizations at which participating photo editors were interviewed.	101
Table 4.2. Frequency of relevant statements among the 14 photo editors interviewed.	103
Table 5.1. Data collection process.	158
Table 5.2. Examples of negative and positive captions in the dataset.	169
Table 6.1. Random assignment of respondents to each of the experimental conditions.	204
Table 6.2. Experimental conditions detailed	210
Table 6.3. Sample attitudes toward climate change compared with national attitudes.	209
Table 6.4. Relevant respondent judgments on respective value of photos A and B	222

List of Figures

Figure 3.1 Top left: poster for the film Take Shelter (2011). Bottom left: screenshot from The Day After Tomorrow (2004). Top right: screen grab from the video game Fate of the World (2011) and below, the documentary, An Inconvenient Truth (2006).	58
Figure 3.2 David Maisel’s Black Maps. Left: Bagdad, Arizona 3, 1985. Right: Pima, Arizona 5, 1985.	70
Figure 3.3 Saylor / Morris for the Canary Project, Glacial, Icecap and Permafrost Melting. LEFT: LIX: Lake Paron, Peru, 2008. RIGHT: XXXVI: Bellingshause Base, King George Island, Antarctica, 2008. Source: Saylor / Morris.	71
Figure 3.4. From “Things Fall Apart”; LEFT: Hurricane #4, Florida (2006); RIGHT: Earthquake #3, India (2001).	75
Figure 3.5. Left: Exhausted 18 year old American soldier from the 1st Infantry Division on the floor after completing a 11.5 hour combat mission to search for weapons caches in the Alaugal valley in Nishagam, in Afghanistan’s eastern Kunar province (Getty). Right: American soldier collapses in exhaustion. Korengal valley, Afghanistan 2007. (Balazs Gardi)	80
Figure 3.6 Left: TIME cover, Apr. 3, 2006 (photo). Center: Front page of the New York Times Sunday Review section, Nov. 25, 2012 (illustration). Right: Newsweek European edition cover, June 12, 2015 (photo).	82
Figure 3.7 The New York Times front page, October 31, 2012. Main photograph by Kirsten Luce for The New York Times	84
Figure 3.8. The New York Times front page, Oct. 28, 2015. Photograph by Josh Haner for The New York Times.	86
Figure 3.9. The Washington Post front page, August 3, 2015. Photo: AFP.	87
Figure 3.10. The Los Angeles Times front page, July 6, 2015. Photo by Allen J. Schaben / Los Angeles Times.	89
Figure 4.1. Left: Students protest the choice of Myron Ebell to head the EPA. (Susan Svrluga/The Washington Post). Right: A group of students demonstrate outside the White House in opposition to President-Elect Donald Trump. Jose Luis Magana/AP	108
Figure 4.2 Story on poverty in the Central Valley, published in 2015 by the San Francisco Chronicle, featuring photographs by Leah Millis.	113
Figure 4.3. A photograph by Renee C. Byer featured on page A12 of the May 17, 2015 edition of The Sacramento Bee shows a woman bathing her one-year-old grandson in bottled water. Because of the photographs, the story also made it to the front page of that day’s edition.	114
Figure 4.4. Cover photo for The New York Times portfolio of Matt Black’s photographs illustrating the drought in California’s Central Valley.	116
Figure 4.6. In this example, a climate change photograph occupied the most prominent position of all (page one, above the fold), because the photography turned out to be more compelling than expected. Photo by Josh Haner. Caption: “A river created from melting ice on the Greenland ice sheet, near where a team of scientists set up a research camp this summer.” The New York Times, A1, October 28, 2015.	126

Figure 4.7. April 1, 2015. Gov. Jerry Brown talks to reporters in Echo Summit, Calif., about his new executive order mandating cities and towns to cut water usage by 25 percent. (Rich Pedroncelli / Associated Press)	133
Figure 4.8. A Thanks for Rain sign is pictured near a Pray for Rain sign on Tuesday, Jan. 2, 2016, on Merle Avenue in Modesto. Joan Barnett Lee/ Modesto Bee..	134
Figure 5.1. Clustering users based on the categories of their photos Source: Hu et al. (2014: 598). Explanation: C1 = cluster of users who post a bit of everything, with an emphasis on food photos. C4 are users whose posts are overwhelmingly comprised of selfies. “Captioned photo” means “meme.”	146
Figure 5.2. A Google Trends query was performed showing the relative popularity of the search terms “global warming” (in red) and “climate change” (in blue) from April 2011 to April 2016.....	161
Figure 5.3. Number of posts in the dataset by month posted.....	166
Figure 5.4. Distribution of emotions in the captions by focus of the photo.	169
Figure 5.5. Presence of humans by photo theme	171
Figure 5.6. Average number of likes by theme. Number of followers is relatively stable across the three themes (Causes=303, Impacts=339, Solutions=295), making the results easily comparable.	172
Figure 5.7. Image posted on December 2, 2015. Location: Near Bakersfield, CA. .	176
Figure 5.8. This picture was posted on September 15, 2015. Location: La Quinta, CA.	178
Figure 5.9. Google Maps screenshot showing the approximate area (in red) where the photo in Figure 7 was taken.	179
Figure 5.10. Page A1 of The New York Times, April 5, 2015.....	180
Figure 5.11. Image posted October 29, 2015. Location: Folsom, CA.....	181
Figure 5.12. Folsom Lake water level in the 2015-2016 water season. Chart generated July 16, 2016 using the Department of Water Resources’ California Data Exchange Center.	182
Figure 5.13. This image was uploaded on February 9, 2016. Location: Los Angeles, CA.....	183
Figure 5.14. Similar images in the dataset.....	184
Figure 5.15. This image was posted on August 24, 2015. Location: Bay Area.	185
Figure 5.16. Image posted on November 11, 2015. Location: Big Sur, California. .	186
Figure 5.17. Image posted on March 11, 2016. Location: Yosemite National Park, CA.....	188
Figure 5.18. Other common “solutions” images in the dataset include shots of recycling efforts (R), dietary choices (middle) and drought-proof garden features (L).	189
Figure 5.19. Date: September 15, 2015. Location: Los Angeles, CA.	190
Figure 6.1. The A and B story presentations in the Cause category.....	211
Figure 6.2. The A and B story presentations in the Impact category.....	213
Figure 6.3. The A and B story presentations in the Solutions category.....	215
Figure 6.4. Geographical distribution of respondents.....	207

1. Why study climate change photographs?

1.1. A threshold moment

In this thesis, photojournalism is questioned and examined as a way of engaging the public with climate change. Climate change, a defining global issue at the beginning of the 21st century is largely due to human activity in the form of burning fossil fuels, and threatening to displace millions, leading to substantial security threats, and can be conceived of essentially as a problem of inter-generational justice. The way humans envision their future on this planet, and that of their descendants, determines the mitigation and/or adaptation actions they are willing to engage in. However, in 2017, at the time of this writing, this long-term problem is at a particularly critical threshold: the time for avoiding the 2 degree warming scientists agree would be rife with devastating effects is now or never. Despite the landmark agreement reached in Paris in December 2015, where 150 countries pledged to make substantial cuts to their greenhouse gas emissions, experts from the International Energy Agency have concluded that these reductions “would be consistent with an average global temperature increase of around 2.7 degrees Celsius by 2100, falling short of the agreed goal to keep the rise below 2 degrees” (IEA 2015:4). It appears increasingly unrealistic that the universally accepted “safe” threshold of a 2 degrees Celsius warming by the end of the century could be maintained (World Bank, 2014: 5; Rogelj et al., 2016), even if the reductions committed to in the Paris Agreement take place. The fifth Assessment Report of the International Panel on Climate Change unequivocally warns that “without additional mitigation efforts beyond those in place

today, and even with adaptation, warming by the end of the 21st century will lead to high to very high risk of severe, widespread and irreversible impacts globally” (IPCC, 2014:17). Additional individual actions and political pressure at the local and regional level are necessary to prevent catastrophic warming. Public engagement is necessary, not only because the public in democratic societies influences which policies and which international negotiation positions are going to be adopted by the elected representatives, but also because consumers themselves, in their daily life, directly influence the level of greenhouse gas emissions (Whitmarsh, O’Neill & Lorenzoni, 2011: xvi). Therefore, the work of journalists, activists, opinion leaders and scientists in engaging the public with climate change is particularly crucial.

Journalism, in particular, has a vital role to play, as a mediator between science and the public, a non-specialist source of information that citizens can use to make their political and lifestyle choices. As Boykoff & Rajan (2007) observe, “whatever the subject, media coverage has helped to shape public perception and, through it, affected how science is translated into policy, most notably with regard to the environment, new technologies and risks” (Boykoff and Rajan, 2007: 207). Wilson (2000) emphasized that most of what people know about climate change, they know from journalists, which led him to conclude that the media bear a heavy responsibility in reporting on complex environmental issues: “increasingly it is the media’s responsibility to translate complex scientific concepts to the ‘lay audience’ . For the public, the reality of science is what they learn from the media” (Wilson, 2000: 201).

1.2. Role of climate journalism

In this thesis, an overall assumption is made about the role of journalism in a liberal democratic society as not reduced to “he said, she said” reporting of opinion. Pooley (2011) distinguishes between three roles a climate reporter can take on: that of a referee, a judge-and-jury, and that of a stenographer. He emphasizes that the “referee” role is the most appropriate, since it implies neither opinionating (judge-and-jury) nor sticking to a false ideal of balance (stenographer), but providing an informed account of the facts and verifying claims against evidence. A “referee” model of climate reporting is slowly gaining ground, despite two decades of the stenographer approach being the norm (Boykoff & Boykoff, 2007; Oreskes & Conway, 2010). Especially in the United States, journalists’ overzealous allegiance to the norm of objectivity, or balance, meant that the public remained unsure of the basic facts of climate change far longer than necessary. This resulted in “balance as bias” reporting, whereby claims about climate change being real and anthropogenic were given the same amount of airtime or column space as opposite claims (Boykoff 2004, Boykoff & Boykoff 2007, Patterson 2014), even though the former are backed by 97 percent of actively publishing climate scientists worldwide.² Pew (2015) reports that in 2015, only 50 percent of the public believed that “the earth is getting warmer due to human activity,” compared to 87 percent of members of the American Association for the Advancement of Science. Even though the AAAS published an official statement as early as 2006, to the effect that “the scientific evidence is clear: global climate change

² According to NASA. <http://climate.nasa.gov/scientific-consensus/> [Accessed September 22, 2016]

caused by human activities is occurring now, and it is a growing threat to society”³, the 37 percent gap between that consensus and public knowledge persists. This may be due to misinformation on the part of the media (Shuckburgh, Robison and Pidgeon, 2012), where the standard of balance has long been applied to such an extreme degree that even in the case of overwhelming consensus on one side, both sides are given equal play. However, it may also be the case that people interpret what they read about climate change in a way that fits with their prior beliefs, according to the theory of confirmation bias (Whitmarsh, 2011). A recent meta-analysis published in *Nature Climate Change* has shown, for example, that one of the strongest predictors of attitudes toward climate change is not the level of information, but rather political affiliation (Hornsey et al., 2016). Pew (2016) reports that climate change ranks a low 16th out of 18 major issues that voters considered top policy priorities in the 2016 election year.

Beyond moving towards a referee model with respect to the facts of climate science, what is the role of journalism in reporting climate change today? Schudson (2008: 8-9) posits six important functions journalists should fulfill: (1) provide fair and full information on matters of public importance, (2) serve as watchdog to keep government power in check, (3) analyze and interpret complex issues, (4) build bridges and empathy between people, (5) serve as a public forum for dialogue and the exchange of ideas, and (6) mobilize people in support of particular programs conducive to the public good. These functions can be applied to climate change, an

³ AAAS Board Statement on climate change, December 9, 2006. Available at http://www.aaas.org/sites/default/files/migrate/uploads/aaas_climate_statement.pdf [Accessed September 22, 2016]

issue that every reporter, no matter what his or her beat, may have to grapple with. With regard to the first and third function enumerated by Schudson, the public must be informed, not only of the anthropogenic component of warming, but also of the uncertainty inherent in modeling and the difficulty in precise prediction of climate change effects, especially at a local scale. Journalism serves a crucial role of mediator between the scientists and the public, and can also tie the scientific facts of climate change with its other dimensions in policy, energy, technology and business. Second, citizens should be able to rely on the press to keep an eye on the fossil fuel industry, lobbyists, and government officials who are deceiving the public or not following through on their commitments to reduce greenhouse gas emissions. The remaining functions also apply: climate change journalism should help build empathy for those already suffering from its dire effects, not only because they need help, but also because those effects will become more and more widespread, reaching even the privileged. The variety of available policy responses to climate change, from a carbon tax to geoengineering measures, is broad – here, journalists can provide a forum for the debate over which policies should be implemented or how much should be spent today to avoid catastrophe a few generations down the road. Lastly, even though this may be the most controversial of Schudson’s proposed functions – in the face of well-documented evidence that climate change is a threat to prosperity and even to international security (Department of Defense, 2015), journalists individually or news organizations as a whole, through their editorial guidelines, may choose to take on a responsibility to be advocates for climate action. Though the catastrophic consequences of climate change may not affect most of the world’s population alive

today, some “climate refugees” already exist even in the United States – notably, in Alaska and Louisiana. Climate change is, in a sense, the direct opposite of sustainable development, defined by the United Nations’ Brundtland Commission in 1987 as “meeting the needs of the present generation without compromising the ability of future generations to meet their own needs” (UN WCED 1987: 24). If developed and developing economies pursue the high emissions path they are currently on, the needs of future generations will be at high risk of going unmet. Indeed, it can be said that climate change is a critical intergenerational justice issue above anything else. In fact, in 2015, 21 children and teenagers ranging from 8 to 19 years old sued the United States government accusing it of being negligent in fighting climate change and thus endangering their right to live in a stable climate.⁴ On November 10, 2016, a United States District Court allowed the suit to proceed to a ruling, despite the Obama administration pushing for its dismissal. The Intergovernmental Panel on Climate Change has made explicit the symbiotic relationship between climate change mitigation and sustainable development. Indeed, most of the actions designed to curb carbon emissions lead, directly or indirectly, to a more sustainable mode of economic production and natural resource use in the long term (IPCC 2007). One example is the sustainable management of forests: reducing deforestation can help capture carbon emissions and conserve forest resources for the future.

Considering the overwhelming evidence that has been amassed in this case since the late 1980s, it is safe to say that the threat of climate change is clear and indisputable, similar to nuclear proliferation (Falk, 2010). While journalism is not the

⁴ Schwartz, J. (2016). “Climate Change Reaches Courts as Citizens Sue”, *The New York Times*, A6, May 12.

only climate communicator it is the one that arguably has the broadest reach. Trade publications like the *Columbia Journalism Review*,⁵ professional journalist-training programs like Deutsche Welle Akademie⁶ and Poynter News University⁷ argue that journalism must cover climate change in accordance with the scientific evidence and help the public to learn about the different policy options that can ensure future generations will have a chance to live safely on Earth. In practice, this means informing the public about the reality of the threat and ways to counter it, analyzing and breaking down complex scientific information inherent in the climate change story, holding governments and corporations accountable for the environmental costs they impose on others, illuminating the plight of those already suffering direct consequences of rising sea levels or intensified drought, and providing a public forum for the open exchange of ideas about how to respond to the problem. It means, in other words, engaging the public in such a way as to raise understanding, but also concern and readiness to act. As Whitmarsh, Seyfang & O'Neill (2011: 56) observed already in 2011, “in order to meet national and international greenhouse gas emissions reduction targets, there is an urgent need to understand and enable societal engagement in mitigation.”

1.3. Why photographs?

In this thesis, I will focus on the role of news photographs depicting climate change. In other words, despite the importance of other visual media, this thesis does

⁵ Eshelman, R. (2014). “The Danger of Fair and Balanced”, *Columbia Journalism Review*, May 1.

⁶ James, K. (2014). Reporting on Climate Change. On Media, Deutsche Welle Akademie. <http://onmedia.dw-akademie.com/english/?p=19065>

⁷ Poynter News University, “Covering Climate Change” – free interactive online course by Tom Yulsman; <http://www.newsu.org>

not consider climate change visuals such as art works, cartoons, videos, maps, graphs or memes. The reason for excluding other forms of visual media is primarily to allow for a more focused, precise understanding of the affordances specific to photography. As a photo editor by training, I feel particularly strongly about the potential of photography to communicate instantly and poignantly about important issues of international scope. In my 2010 master's thesis I approached the meaning-making role of photojournalism through two international competitions and their selection of "best" images of war. In the climate change communication arena, I am not the first to point to the value of photographs, despite the inherent difficulties in the visual depiction of climate change. Indeed, photographs have three main attributes defining their specific way of communicating a news story: (1) they appear more trustworthy than other media because of their indexicality; and (2) they lack propositional syntax (Messaris & Abraham, 2001), which means they have suggestive power without the need to spell anything out. These attributes of photojournalistic images are expanded upon in Chapter 2; they form the basis for photojournalism's particular strength as a tool of communication. Marx et al. (2007) observe that information can be processed in one of two ways: analytic, which is unique to humans, operates on logical rules and abstract symbols, (Marx et al., 2007: 49) or experiential, which "relates current situations to memories of one's own or others' experience" (Marx et al., 2007: 48). According to Columbia University's Center for Research on Environmental Decisions, it is important to target the experiential, rather than only analytic processing systems when communicating climate change to an audience: "despite evidence from the social sciences that the experiential processing system is the

stronger motivator for action, most climate change communication remains geared toward the analytic processing system” (CRED, 2009: 16). Photographs are particularly adept at activating the experiential processing system in the brain, circumventing the analytical system. As Schneider & Nocke observe in the opening chapter of their book *Image Politics of Climate Change*: “the unique benefit of condensing knowledge into a single picture frame is that image, in contrast to texts alone, have the ability to very directly address and concentrate human perception” (Schneider & Nocke, 2014: 16). Neuroscience confirms that visual information is processed in a more immediate and potentially more emotional way than verbal information. According to LeDoux (1986: 237-248) “the sensory signals from the eye travel first to the thalamus and then, in a kind of short circuit, to the amygdala before a second signal is sent to the neocortex,” which means, in lay terms, that visual stimuli have the power to circumvent the “rational” thought-processing part of the brain and affect viewers emotionally first. Williams (2005: 204) concludes that “the eyes see and, from a preconscious mode using the amygdala in concert with the prefrontal lobes, motivate behavior before the rational mind is activated.”

One key question posed in this thesis is the following: is photojournalism being used to its fullest potential in engaging the public with climate change? Based on a nationally representative study conducted in 2006, Leiserowitz found that “American associations to global warming were dominated by relatively abstract images of geographically or psychologically distant impacts on other people, places, and species” (Leiserowitz 2006: 64). One way to address this problem is by diversifying the images presented to the American public when communicating about

climate change. Schneider & Nocke (2014) make a point of emphasizing the importance of photojournalistic images, among all other visual media, relating back to the second attribute of photographs mentioned above: “(...) when images get taken up by the media they gain collective visibility and something else can happen. Pictures can imprint their gestalt unto the memory of observers: some images become *iconic*; in other words, they start to influence or even dominate the concept of a world under the threat of climate change” (Schneider & Nocke, 2014: 17).

1.4. Definitions of key terms

Engagement

One of the terms most often used in this thesis is “public engagement”, or engagement for short, with climate change. It is important to clearly define at the outset what is meant by this. In general, all definitions of engagement include the three planes of cognition, attitude, and behavior with respect to an issue. In the case of engagement with climate change, the most straightforward formulation can be found in Manzo (2010b): climate change communication, she states, operates in the planes of “cognition (knowledge and understanding of climate science), affect (interest in and concern about the issue), and behavior (personal engagement and motivations to act)” (Manzo, 2010b: 196). Lester, similarly, defined engagement along those three planes, though she introduced a gradation in intensity of engagement: interest in an issue is the most superficial form of engagement, emotional involvement with an issue lies in the middle, while participating in activities related to the issue is the fullest form (Lester, 2010) – the assumption being that those who act are more engaged than those who simply know or even those who

deeply care. This does not mean, however, that one must go sequentially from knowledge, to emotion and finally to action. Lorenzoni et al. (2007), and later Whitmarsh, Lorenzoni & O'Neill (2011), also based their definition of engagement on these three dimensions. They emphasize that in general, engagement is a state of “personal connection” with the issue at hand, and that it “encompasses what people know, feel and do in relation to climate change” (Whitmarsh, Lorenzoni & O'Neill, 2011: 3-4). They also formulate their definition of engagement in such a way as to underscore the shortcomings of the traditional “deficit model” of science communication, which held that people need merely be correctly informed about the state of an issue and its possible consequences in order to make the right decisions. No, according to Lorenzoni et al. (2007:446), “it is not enough for people to know about climate change in order to be engaged; they also need to care about it, be motivated and able to take action.”

In sum, this thesis considers public engagement with climate change as always comprising of these three basic elements or aspects, and investigates the power of climate change photographs in mobilizing each one:

1. knowledge/information/awareness;
2. concern/emotion/attitude; and
3. motivation to act/behavior change.

Lorenzoni et al. (2007) observe that these three planes, while tightly interconnected and necessary to constitute full engagement, do not necessarily follow in that order – for instance, one may engage in climate-friendly behavior before understanding why or without perceiving the broader implications of the action. An example is

purchasing an electric car in California – one may be motivated to do so purely out of economic reasons, since the state offers significant tax advantages in addition to the federal tax credit for new electrical vehicles. An entire sub-discipline of decision research and social psychology, called “choice architecture,” studies how individuals can do the right thing by simply being presented with choices organized in a specific way so that the default option is more environmentally friendly (Kunreuther & Weber, 2014). As an example, Rutgers University saved over a thousand trees in one year by making double-sided printing the default setting on all its printers (CRED, 2009). It is not necessary always to aim for full engagement – if a behavior conducive to climate change mitigation is associated with benefits to personal interest, it still contributes to the common good if the audience adopts it. As will be discussed later on, engagement in this rich sense is very difficult to operationalize, and somewhat simplified measures of it are used in Chapter 5, dealing with online user engagement with climate change images posted on social media platform Instagram.

Climate change versus global warming

Throughout this thesis, the term “climate change” is used in preference to the closely associated term “global warming.” Until recently, the latter term was more frequently used in media discourse, and research showed that “global warming” was more familiar to the public and evoked more concern (Whitmarsh, 2009). In 2011, Villar & Krosnick conducted two surveys, in the United States and in Europe, asking questions about concern regarding this issue, randomly assigning respondents to questions phrased about “climate change” and others to the same questions about “global warming.” The results showed that the terms were largely interchangeable as the

responses were similar. As shown in Chapter 2, a Google Trends search demonstrates that although during the period 2006-2009 there was a considerable disparity, with “global warming” being several times more popular as a search term, the popularity of the term “climate change” matched that of “global warming” in January 2013 and the two have been searched for at comparable rates since then. Among other things, this was caused by the prominence of the Intergovernmental Panel on Climate Change and its annual Conferences of Parties, bringing together leaders from 192 countries to try to reach a binding agreement reducing carbon emissions. It may also have been the result of government decisions to use the term “climate change” in their official communications more often than the other, scientifically less accurate term. Indeed, the phenomenon in question results in an overall increase in average global temperature, but it encompasses more than that: some regions will find their climates improved, and there will be other consequences besides temperature change, such as increased rainfall, more extreme weather events, or intensified drought. In 2014, Leiserowitz et al. found through two nationally representative surveys that the term “global warming” is more universally associated with the negative consequences of climate change, climate change as a threat, and with traditional icons of climate change such as melting ice and stranded polar bears. In the interest of using the broadest and most scientifically accurate term possible, “climate change” was chosen for use in this thesis. It is especially important in Chapter 5, for example, when analyzing the content of Instagram shared images of climate change, comparing the number and kind of pictures showing causes, impacts and solutions. It is likely that if

the term searched for had been “global warming”, the posts would be even more skewed towards the negative aspects of this phenomenon.

Visual framing

A last term that should be defined at the outset is that of “visual framing.” While framing theory is well documented and widely used in the media studies literature, only a handful of recent studies analyze “visual” framing. Whereas in general news framing means to select “some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation” (Entman 1993: 52), visual framing consists of the same selection and exclusion process but with respect to visual texts. Schwalbe’s definition of visual framing will be used here:

Visual framing is a continuous winnowing process. It begins with the choice of events to cover, followed by the selection of what pictures to take, how to take them (angle, perspective, assumptions and biases, cropping, and so forth), and which ones to submit. (Schwalbe 2006: 269).

Importantly, then, visual framing must be considered in all its stages: from the photo editors who assign a particular photographer and give him or her instructions, to the work of that photographer in the field, where decisions are made about timing, angle, exposure and crop, and then back to the photo editor who filters out one or a handful of photos out of hundreds and who decides in conjunction with layout editors and news editors on the placement and size of the photo online and in print. At the same time, visual framing is also important to study at the four different levels expanded upon by Rodriguez & Dimitrova (2011): from denotation (description of

photo content, organization into themes), to semiotic-stylistic resources employed by the photo, to its connotative meanings, and finally to the ideological message embedded in it. This dissertation will focus most heavily on the selection and filtering, or “gatekeeping,” stages of image production, as these tend to be overlooked in existing research.

1.5. A mixed method, longitudinal approach to visual framing

Because visual framing is conceived of here as a continuous process which goes through many stages, the thesis examines several of those stages in detail: first, a more theoretical chapter focuses on the images of climate change themselves, specifically on one frame I call “the apocalyptic sublime” and its potential implications for public engagement. Then, a series of interviews with photo editors provides insight into the gatekeeping of climate change visuals. Next, a content analysis of social media shared images of climate change serves to better understand the existing audience frames, the visual vernacular of climate change communicated by regular people, who are not climate communication experts. Finally, a survey of news readers presented with two alternative photos illustrating a cause, impact, and solution story brings together the audience frame and the media frame to gauge whether different visual frames make for a different reception of the same climate change story.

Though not concentrating on one specific image or set of images, this approach follows the “three sites at which the meanings of an image are made: the site(s) of production, the site of the image itself and the site(s) where it is seen by various audiences” (Rose 2012: 19). Hansen & Machin (2013) emphasize that the

first stage, the production site, has received almost no scholarly attention, while the consumption site has been researched but to a far lesser degree than the content site. For this reason, this thesis does not provide a systematic analysis of the full corpus of existing media images themselves. Rebich-Hespanha et al. (2015) have contributed a sweeping overview of images of climate change in American newspapers, building on previous research by Smith & Joffe (2009), DiFrancesco & Young (2011), and O'Neill (2013). In their edited volume on visual environmental communication, Hansen & Machin take stock of the research done in this field and conclude that “as well as attending to the immediate semiotic characteristics of visuals, visual analysis needs to focus on the contexts and sites of visual communication” (Hansen & Machin, 2013: 160).

Although this thesis includes elements of quantitative methods, in Chapter 5 and Chapter 6, most of the research conducted here is qualitative, ranging from visual discourse analysis, to semi-structured interviews with photo editors and the social semiotic visual analysis of Instagram shared images of climate change. Even in Chapter 6, the split samples test of two different images, follow-up interviews were conducted with a subset of respondents, making that chapter partly qualitative as well.

1.6. Outline of the thesis

After outlining the current state of literature on visual climate change communication and focusing on one particularly important visual frame, this dissertation will present results of interviews with photo editors, who play a pivotal role in image framing as outlined above. A running hypothesis here is that not enough care is taken nor resources invested into commissioning and publishing engaging photographs related

to climate change. Liam Kennedy noted in an examination of the war photographs from the 2003 Iraq War that “for all the constraints, many American photographers have been producing imaginative work, some of them pushing at the boundaries of the frame even as they work within it. However, very little of this more imaginative and investigative visual journalism has made it into the mainstream media in the United States” (Kennedy, 2008: 286). The same could be said for climate change images – many highly engaging images are produced, yet few find their way into the mainstream, where they could exert the highest impact. Second, I will examine existing mental frames of climate change by studying the visuals that regular social media users associate with climate change. Finally, I conduct an audience experiment, the results of which will open up avenues for news media to expand their visual framing of climate change so as to foster public engagement.

As a major political force on the world stage, the highest source of CO₂ emissions per capita, but also the seat of most energy innovation, the United States has a more important role to play in mitigating climate change than any other nation. Therefore, despite the fact that many studies have already scrutinized mass media coverage of climate change in the United States, it is important to analyze the role of images in this national media environment. In addition, in two chapters built on the results of data collection and analysis, Chapters 4 and 5, I focus on visual climate communication in the state of California, for two essential reasons: first, with the signing of its aggressive Climate Bill in 2015, aiming to draw half of the state’s electricity from renewable sources by 2030, California is one of the most progressive states in the United States in terms of climate change mitigation. Second, according to

the Yale Project on Climate Change Communication, the citizens of California are particularly concerned and attuned to the topic already. For instance, the researchers found that 79 percent of Californians surveyed in 2013 believe that “global warming is happening” and 78 percent “say the issue of global warming is very or somewhat important to them personally” (Leiserowitz et al., 2013: 19). Indeed, Californians are no strangers to natural hazards (think of the historic 1906 earthquake) nor are they unaware of the impacts of climate change – reduced snowpack causing intensified drought, higher temperatures leading to longer and more devastating wildfire seasons. Finally, in Rebich-Hespanha et al.’s 2015 landmark content analysis of climate change photographs published in 11 American newspapers, photos taken in California composed over 10 percent of the dataset of 350 images. This implies that there is an abundance of photographic documentation of climate change in this state.

In one of the first thematic analyses of newspaper images of climate change, Smith and Joffe (2009: 660) note that “given the emotive power of visual information, it will be important to explore the suggestion that newspaper imagery helps shape public engagement with climate change risk.” Rebich-Hespanha et al. (2015) offered the most recent systematic review of the existing visual frames in photographic coverage of climate change in the United States has been done by, building on Rebich-Hespanha’s doctoral dissertation in geography at the University of California Santa Barbara (2011).⁸ Complementary studies have added insight into visual frames of climate change present in various western media: Canadian

⁸ Rebich-Hespanha’s dataset was composed of 275 images that were published between 1983 and 2009 in *The Economist*, *Los Angeles Times*, *Newsweek*, *The New York Times*, *Sacramento Bee*, *San Francisco Chronicle*, *San Jose Mercury News*, *USA Today*, *US News and World Report*, *Wall Street Journal*, and *Washington Post*.

(DiFrancesco & Young, 2011), British (Manzo 2010b, O’Neill, 2013; Smith & Joffe, 2009), and Australian (O’Neill, 2013). However, no single visual framing study has considered the various stages of framing (Schwalbe, 2006). In addition, an overwhelming majority of research in this nascent field does not come from journalism or media scholars but from geography and environmental studies departments in the United States (e.g. University of Colorado, Boulder) and the United Kingdom (e.g. University of East Anglia). In this dissertation, building on the valuable work of these scholars, and integrating the study of visual climate change communication into communication and media studies, the following questions will be posed:

1. Is there a predominant visual frame or trope that climate change is represented by?
2. Do photo editors in the regional press search for visual frames which lead to heightened public engagement?
3. Do members of the public internalize the visual frames used by media when they think about climate change?
4. Do the photographs used have the potential to enhance public engagement with climate change?

With respect to each research question, the following working hypotheses have been formulated at the outset:

1. The often used “apocalyptic sublime” frame of climate change photographs carries significant risk of attracting audiences to the image for its aesthetic

value and confirming them in the conviction that nothing can be done to halt the progress of slow moving but ultimately catastrophic changes in the Earth's climate system.

2. News and photo editors tend to rely on visual shorthands when illustrating environmental stories. They tend to reach for striking, compelling imagery that narrowly represents the complexity and opportunities involved in fighting climate change and focuses only on its negative aspects.
3. Members of the public use visual frames of climate change circulated by the media to construct their own “mental images” of climate change. If news media use predictable, narrow frames, so will the public.
4. Photographic framing of climate change could be both broader and deeper, and thus more engaging. Missing frames could be easily produced, as is already the case in alternative communicating practices such as art, public policy and activism.

In order to seek answers to the aforementioned research questions, and to test the hypotheses listed above, the following studies are part of this thesis:

1. A theoretical analysis of the apocalyptic sublime frame as it appears in fine art photography and front page news stories;
2. A set of semi-structured interviews with photo editors (or news editors) in major American (with an emphasis on Californian) news sources;
3. A content analysis of climate change images shared on a prominent image-driven social media platform by Californians over the course of one year;

4. A small-scale split-sample controlled experiment comparing the effects of innovative, engaging imagery used in articles about climate change to the effects of images currently used.

The four main elements of this dissertation will correspond to its four main chapters (Chapters 3, 4, 5, and 6), and each will open with a respective introduction and methodological explanation. A final concluding chapter will sum up all four research components.

A significant body of research has already been carried out with respect to climate change communication in general, and some scholars have considered visual communication's role in mobilizing the three dimensions of engagement: cognitive, emotional and behavioral. However, more systematic and in-depth study is needed to understand how the currently existing visual frames come to be and how they could be expanded and enriched. Most importantly, an approach to visual framing that considers it as a process and investigates the formation of frames at various points within that process is lacking. It is my hope that this research will not only produce results for those involved in communicating about climate change, but about other complex challenges of a global nature as well.

2. Can news photographs drive public engagement with climate change?

Climate change is an urgent, yet long-term problem that can no longer be understood as an environmental issue alone, but spans the political, economic, cultural dimensions of collective life as well. Communicating about climate change through images can engage people who normally would not pay attention to environmental problems, yet all too often the images used in news media reports do the exact opposite: they confine the issue back into worn-out tropes of pollution and natural degradation. The public is presented with pictures of polar bears, smoke stacks, receding glaciers, officials making speeches – these kinds of images, this dissertation argues, do not broaden the spectrum of what climate change means in everyday life nor why people should care about it.

2.1 A challenging subject for visual communication

Climate change has been present on the international news agenda prominently since the late 1980s (Campbell Keller, 2009: 67-73; Boykoff & Boykoff, 2007: 1193-1194). Policymakers, journalists, environmentalist advocacy groups, and recently even artists have been using various media and messaging strategies to convey to the public the nature of the problem and the possible solutions. Despite growing awareness of the issue, especially in the years 2000-2010 (with a peak in 2007-2009),⁹ current levels of concern and readiness to act remain dismally low.¹⁰

⁹ Andrews, K., Boykoff, M., Daly, M., Gifford, L., Luedecke, G., McAllister, L., Nacu-Schmidt, A., and Wang, X. (2015). World Newspaper Coverage of Climate Change or Global Warming, 2004-2015. Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, Web. [Accessed October 2, 2015]

¹⁰ Pew Research Center, Spring 2015 Global Attitudes survey

One of the main difficulties in garnering and sustaining public attention for the climate change story is that it lends itself to thematic rather than episodic coverage, lacking breaking news character (Callison, 2014; Nixon, 2011). At a time of shortening attention spans, information overload, and economic pressures on the news industry to reduce staffing, the tendency for news to privilege episodic framing is only rising (Waltz, 2014). This trend affects coverage of environmental issues disproportionately, as they tend to be low-intensity, long-developing crises: “in order to fit [slow onset environmental hazards] into the news agenda, journalists are required to picture them as the recent outcome of an event rather than the inevitable outcome of a series of political and societal decisions” (Hannigan 2006: 84). Climate change especially is difficult to draw in as an “event” under any of the classic characteristics of newsworthiness, as “it has no immediate resolution (...) and it contains a great deal of ambiguity” (Lester, 2010: 72). When discussing coverage of international disasters, Moeller (2006) pointed out that the media are more likely to cover “simple” rather than “complex” emergencies. Simple emergencies are those where an arresting disaster occurs and requires global attention (and donations), but complex emergencies are those “man-made disasters in which humans are at fault” (Moeller, 2006: 185). Climate change appears to be precisely one such (drawn-out) man-made disaster: it has been argued in subsequent IPCC reports that the more frequent and more intense occurrence of precisely these “simple” emergencies such as tropical storms and coastal floods is actually itself a symptom of an underlying “complex” emergency – anthropogenic climate change. Overall, though, because of the high degree of uncertainty both in linking particular extreme weather events to

past causes and in predicting future impacts, climate change is a classic example of a low-intensity crisis - or as James Howard Kunstler (2005) put it, “a long emergency.”

Moeller describes the difficulty of sustaining attention to this kind of story – and though she is not here referencing climate change specifically, the observation fits:

‘There is a reciprocal circularity in the treatment of low-intensity crises: the droning “same-as-it-ever-was” coverage in the media causes the public to lose interest, and the media’s perception that their audience has lost interest causes them to downscale their coverage, which causes the public to believe that the crisis is either over or is a lesser emergency and so on and so on.’ (Moeller, 1999: 12)

Photojournalism has the ability to “freeze” an event in a single frame, regardless of its underlying complexity. Photojournalism’s strength in focusing public attention, its reputation for authenticity (Newton, 2001) and its potential to produce icons which remain embedded in the collective psyche (Zelizer, 2006) all contribute to its widely recognized power in shaping interpretations and understanding of important social problems and news events (Coleman 2010: 242). For example, the Vietnam war, a protracted and complicated war, remains visually embedded in the American collective psyche thanks to a few striking stills – the summary execution of a Viet Cong officer (Eddie Adams, 1968), the Kent State shootings (John Filo, 1970), and the girl running from napalm, by Nick Ut (1972). Studies have also shown that a “picture superiority effect” exists, whereby when positively framed images are presented together with negative verbal text, audience members tend to remember and trust the frames conveyed by the images more than those conveyed by words (Boomgarden et al., 2016).

Climate change, however, is particularly challenging to represent visually. Some authors point out that the main culprit behind anthropogenic climate change –

CO₂, is invisible to the naked eye (Manzo, 2010a: 98); however, it could be argued that the deep, underlying causes of almost every social problem are not easy to visualize (for instance, the cause of unemployment or business malpractice). However, a distinct difficulty in attempting to photograph climate change is the existence of vast temporal and spatial gaps between the emission of those gases and the effects experienced by people and ecosystems. One of the direct consequences of this “lag” is the difficulty of attributing any single event (such as a hurricane) directly to anthropogenic climate change.

In current practice, more often than not, media images of climate change circulate clichés of “fear, misery and doom” (Boykoff, 2008: 549), dangers distant in space, time and personal relevance (Garfield, 2007), and scenes that enhance the feeling of individual powerlessness in making a difference (Brönniman, 2002; Boykoff, 2008; Lester & Cottle, 2009; Höijer, 2010, Manzo, 2010a). Leiserowitz (2005: 47) notes that “the moderate level of public concern about climate change (...) appears to be driven primarily by the perception of danger to geographically and temporally distant people, places and non-human nature”, and that beyond the facts, what is missing in the public’s mind are “vivid, concrete, and personally relevant affective images of climate change” (Leiserowitz, 2005: 50). This does not mean that visual communicators should forego all hope of inspiring public engagement through images. Smith & Joffe (2009) for instance, in their analysis of UK broadsheet and tabloid visual coverage of climate change, found that images have the power of making concrete what could otherwise be subject to the discourse of “uncertainty,” often used by lobbyists and politicians. Julie Doyle emphasizes that “climate change

provides a unique opportunity to explore both the possibilities and limitations the visual poses for the communication of temporally complex phenomena (...) within the context of an image-centric, western media culture” (Doyle 2011: 31). Thus, rather than getting discouraged, the potential of images to involve the public in positive ways needs to be further explored. The question is: can visual journalism convey information about climate change in a way that is helpful in fostering public engagement with this issue?

2.2. The case for analyzing news photographs as a vehicle for public engagement

The need for more public engagement

Like other significant social problems on the public agenda, climate change requires both a vigorous and well-informed policy response at local, national and international levels as well as public support to make such policies viable (Corner & Randall, 2011). In democratic societies, public support plays a clear role in determining which policies will likely be implemented, both through the regular practice of voting and petitions or protests. Even more importantly, beyond engagement as a prerequisite for policy support, Whitmarsh et al. observe that “with over one-third of many developed nations’ carbon emissions coming from private travel and domestic energy use (...) individuals clearly have a key role to play in any potential shift towards a low-carbon society” (Whitmarsh et al., 2011: 56).

As mentioned in Chapter 1, the term “public engagement with science” is now preferred to the deficit-model paradigm of “public understanding of science,” which rested on the belief that if people simply know the information, they will adopt a

proper course of action leading to the resolution of problems (Hulme, 2009: 218-219; Nisbet & Scheufele, 2009). That approach has proven to be overly optimistic (Owens, 2000: 1142; Whitmarsh et al., 2011: 23; Leiserowitz 2006: 47). Drawing on three separate mixed methods studies of audience response to climate change information, Lorenzoni et al. (2007) argued first of all that mere understanding of the issues (for instance, the necessity for water conservation) in no way leads to people changing their behavior or even attitude toward the problem. For this reason, Chess and Johnson recommend paying close attention to pre-existing beliefs and values in communicating to audiences about climate change (Chess & Johnson, 2007: 225-230). The question becomes not how to better inform people by producing more educational books, films, and articles, but more broadly and deeply, how to engage them in a way that will spur positive response to climate change mitigation and adaptation action (Moser & Dilling, 2011). Images can be seen as a valuable gateway towards engagement, because of the way they function, communicating at multiple levels at the same time. As Smith & Joffe (2009) observed, “visual content solidifies the climate change risk providing tangible examples of its impact” (Smith & Joffe, 2009: 660).

Mass media reporting on climate change

For decades, the environment was not a subject deemed as newsworthy as politics or sports, and environmental stories were often buried in “science” or “health” sections. Some attention was devoted to the topic of environmental conservation since the late 19th century, but the environment as a source of concern for the public agenda was

not a high priority in news coverage for most of the twentieth century (Hannigan, 2006). Schoenfeld, Meier and Griffin relate the following transition:

By 1969-70, the environmental imperative in all its manifest interdependencies had become so compelling of attention that the press simply had to respond more comprehensively. Hence the appearance of environmental reporters, environmental columns, even environmental sections. (Schoenfeld, Meier & Griffin, 1979: 54)

Concurring with this assessment, Lester (2010) points out that only in the late 1960s did a “media discovery of ‘the environment’ as a social problem and media issue” occur (Lester, 2010: 32). Major newspapers began appointing dedicated reporters to cover the environmental beat, with *The New York Times* appointing their first environmental correspondent in 1969 (Lester 2010: 29). Hannigan confirms that “during the late 1960s and early 1970s, media coverage of the environment rose dramatically and, for the first time, environmental issues were seen by journalists in both Britain and America as a major category of news” (Hannigan, 2006: 82). Moreover, Hansen & Cox conclude in their longitudinal study of media attention to environmental news that the ecological paradigm “has remained firmly on the media and public agenda” ever since its introduction in the 1960s (Hansen & Cox, 2015: 211), even though salience of this issue appears to ebb and flow over time. Similarly, news coverage of climate change has known periods of higher and lesser intensity (Boykoff & Boykoff, 2007), which can be explained by various factors – extreme weather events acting as “windows of opportunity” for the climate change story, periods where other more immediate threats such as unemployment and terrorism subside, or political events such as major climate conferences or IPCC report publications.

During the 1980s, “when global average temperatures started once again to climb [after a relative cooling in the 1970s], the percentage of stories that presented climate change in terms consistent with the science narrative jumped to 91,” demonstrating the initial tendency of news media to confirm the scientific facts (Keller, 2009: 71). DiFrancesco and Young (2011) note that “concern about global warming did not find regular mainstream media coverage until the 1980s after the emergence of the ozone depletion problem as well as the unusually warm summer of 1988 that brought about droughts, floods, and heat waves around the world” (DiFrancesco & Young, 2011: 520). It is worth noting that the unusually warm summer of 1988 coincided with James Hansen’s testimony in Congress, which was the first major public appearance an official made in the United States warning policymakers about climate change. Since the late 1980s, the climate change story has been present in mainstream news, though with varying degrees of intensity, often relying on windows of opportunity in international news – reaching a first peak in 1988, and then another in 1997 with the Kyoto climate protocol. According to Cottle, reporting of this issue underwent three main stages: from simply relating scientific findings and reports; to falling into a polarized, falsely balanced discourse giving nearly equal voice to climate change deniers as it did to recognized scientists (following the stenographer model of journalism discussed in Chapter 1); to slowly accepting the facts behind anthropogenic climate change anew and embracing its existence with rich visual packages demonstrating causes and impacts (Cottle, 2009). A comprehensive study of media attention to climate change spanning 27 countries and 15 years showed a series of “waves” of interest in climate change across

countries, undoubtedly due to the international negotiations occurring periodically within the UNFCCC framework. However, it also found that

media coverage in countries with obligations under the Kyoto Protocol is, on average, more extensive than in others. In addition, Annex B [developed countries] with a high carbon dependency exhibit a particularly high issue attention. It seems that carbon-intensive societies – which are under particular pressure to change lifestyles and the modes of economic welfare generation – extensively debate climate change and politics. (Schmidt, Ivanova & Schäfer, 2013: 1245)

The same authors later surveyed media attention to climate change in Germany, India and Australia over the period 1996-2010 and concluded that the most important drivers of coverage were international summit events such as the Conference of Parties held in Copenhagen in 2009 within United Nations Framework Convention on Climate Change framework as well as agenda setting efforts put together by non-governmental organizations (Schäfer, Ivanova and Schmidt, 2014).

In the US, a major roadblock on the way to covering the climate change story in accordance with the scientific consensus and in a way that would give it its due was, for a long time, the objectivity norm. As Schudson (2001) describes it, the objectivity, or “balance” norm, especially prized in American newsrooms, led journalists to “separate facts from values” and strive to “represent fairly each leading side in a political controversy” (Schudson, 2001: 150). This norm is also a “ritual” (Tuchman, 1972) by which journalists protect themselves from accusations of unfair or biased reporting. Boykoff and Boykoff (2007), through a content analysis of American television and newspaper coverage of climate change in the period 1988-2004, showed that the “balanced reporting” norm caused journalists to amplify the voice of a negligible minority of climate change skeptics. By acting as stenographers,

journalists became guilty of “informational bias.” In a content analysis study of four American newspapers between 1998-2002, Boykoff and Boykoff (2004) had previously established that arguments denying climate change were given the same space on the page as those confirming its existence. The objectivity norm helps to explain the persistent gap between conviction of anthropogenic climate change among scientists and among the public (respectively, 87 percent versus 50 percent).¹¹ On the other hand, at least in the domain of claims-making, a more recent study (Hiles & Hinnant, 2014) involving in-depth interviews with eleven highly experienced environmental journalists, showed that since 2010, environmental journalists claim to write science stories that reflect “the preponderance of evidence” (Hiles & Hinnant, 2014: 442) and that the current version of objectivity they prefer to practice is “interpretation borne out of journalistic experience and extensive research” (Hiles & Hinnant, 2014: 446) – in other words, an approach to reporting on climate change that is closer to the referee model, rather than a passive relay of all existing opinions on the matter (stenographer). Considering all the challenges that often impede communicating about climate change in an engaging way, visual images come to the forefront as ways of communicating that can involve all three dimensions of engagement: thinking, feeling, and doing.

The role of visual images in public engagement

Visual communication appears paramount in fostering a combination of cognitive, attitudinal, and behavioral engagement with an issue of public interest. Acclaimed

¹¹ Pew Research Center, January 29, 2015, “Public and Scientists’ Views on Science and Society”, see chart on page 37.

media scholar Barbie Zelizer noted that the presence of images in news reporting makes the news “more vivid, more accessible, more visible,”; that images wield a specific power over viewers (Zelizer, 2005: 169), yet scholars and practitioners alike do not sufficiently address the myriad choices made in image production, selection and formatting (Zelizer, 2005: 173). Experimental studies have shown that the addition of photographs to a primarily text-based report can inflect the readers’ interpretation of that text, and may enhance information acquisition (Gibson & Zillmann, 2000). Numerous research has emphasized the concrete influence of photographs on determinations of foreign policy (Perlmutter, 1998), their role in shaping collective memory (Zelizer, 2004), or provoking public demonstrations in favor of civil rights (Berger, 2010). Current research also focuses on how specific attributes of photographic images can increase the probability of charity donations (Baberini et al., 2015) in the wake of a humanitarian crisis.

Messariss and Abraham (2001) suggest that images have a threefold advantage over text when it comes to generating engagement. Firstly, they are analogical – their meaning is not constructed through arbitrary associations but on resemblance with their referent object. In other words, while the word “rose” only brings a certain flower to mind by convention, a picture of a rose does so because it looks like an actual rose. Secondly, photographs – unlike other images like paintings or drawings, are indexical, and thirdly, there is no explicit propositional syntax between images as there is between words (Messaris & Abraham, 2001). The “indexical” attribute requires some explanation; it means that photographs are necessarily tied to the object they represent – if something has been photographed, the photo is “proof” that this

object was indeed there, since a photograph could not have existed otherwise. A pioneer of semiotics himself, C.S. Peirce, “defined the (analogue) photograph’s relationship with its object as both indexical and iconic: the photograph not only points to its referent through an imitative or iconic depiction, but it also engages an existential connection with its referential object that is indexical” (Shurkus, 2014: 70; see also Peirce, 1998). This twinning of indexical and iconic signification in a photograph endows photography with a “truth claim” (Newton, 2001), even despite myriad possibilities (both in the darkroom and in Photoshop) of doctoring a photo to make something that wasn’t there appear or something that was, disappear.

Here it is important to delve deeper into the specific characteristics of photography as a sign. This explanation is relevant especially because a subsequent part of this thesis will build on visual social semiotics as a tool for image analysis (Chapter 5). Semiotic theory helps to shed light on why photography, as a type of sign-making mechanism, appears so uniquely trustworthy. In semiotics, which deals with how signs make meaning, one can speak about three types of signs: the iconic, the indexical, and the symbolic (Chandler, 2002). The word “cow” is a symbolic sign of its referent, the cow. It bears no resemblance to the actual cow, and its relationship with the referent is arbitrary and agreed upon within the bounds of a certain language. The fork and knife sign encountered on highways signifies the proximity of a restaurant, it is an iconic sign, as it bears physical resemblance to eating utensils. Finally, an indexical sign is something like a footprint in the mud: it means somebody has walked there, and in this case the relationship between referent and sign is not arbitrary or based on resemblance, but it is necessary: that person left that footprint

there by pressing his or her foot into the mud. In other words, the signifier literally “points” to the signified (Newton, 2001: 5). One of the founders of semiotic theory, C.S. Peirce, defined as indices representations “whose relation to their objects consists in a correspondence in fact” (Peirce, 1982, Vol. 2: 56). In photography’s case, the medium carries the double weight of being an iconic sign (that is, it resembles that which it stands for) *and* an indexical sign at the same time. Seppänen and Väliverronen (2003: 63) summarize this quality aptly: “the photograph is in effect a sign or a symbol that is characterized by both a causal and a material relationship to whatever it represents.” As a result, photographs are not only easily understood, they are also more easily trusted than a drawing or even a map.

Another characteristic of photographs is the way they are able to combine denotative and connotative force. These terms also originate from semiotic theory, where denotation is the first-order meaning of a sign, while connotation occurs when a signified becomes itself a signifier for something else, in which case, it becomes a second-order sign (Bignell, 1997: 16). Denotation, or the first-level meaning, is what is there in the image on an apparent, superficial level, but through connotation the image draws from broad symbolic systems in order to lend deeper meaning to what is depicted. As an example, the winner of the 2011 World Press Photo competition is a photograph by Samuel Aranda of a veiled woman comforting her wounded male relative hurt in the clashes between protestors and government forces in Sanaa, in October 2011. The denotative level is that of the caption: she is comforting her relative. However, at the connotative level, the photograph unmistakably speaks of extreme love between the two people and of ultimate sacrifice. It does so because the

figures in the photo are arranged almost exactly like Michelangelo's *Pietà* sculpture depicting Mary cradling her son Jesus' body taken off the cross.¹² This similarity has sparked a debate among photojournalism critics and practitioners, some arguing that it weakens the news value of the photograph, and some, like scholar David Campbell, emphasizing that the symbolism of the *Pietà* lies in the eyes of the beholder rather than in the news photograph itself (Campbell, 2012). Barbie Zelizer notes that it is the connotative layer that gives photographs their poignancy and power (Zelizer 2004: 159; 2005: 172). When pictures open up layers of meaning that are peripheral, associative and symbolic to the news story at hand is where their impact is the greatest.

Much more has been written about the "power" of photos to move hearts and minds, though most of this writing remains at a philosophical/theoretical level that cannot nor does it claim to be demonstrated in practice. Barthes, for example, in his seminal work *Camera Lucida* (1981), describes an attribute of the still image he calls "punctum." Not all still images have it. It cannot be easily defined. The punctum is something in a photograph that stands out and makes it poignant, that makes it stick in our mind and lets it become a mental image that we will remember. The studium, on the contrary, is the backdrop, the overall "topic" of the photo, which every photograph has. The punctum is like a needle that "pricks" the viewer, emerging out of the studium. According to Barthes, most photographs have no punctum, no "detail" that breaks through the frame and makes the photo memorable beyond its basic informational value of depicting a certain subject. Images without punctum have no

¹² The photo may be seen here: <https://www.worldpressphoto.org/collection/photo/2012/world-press-photo-year/samuel-aranda> [Accessed January 5, 2017]

duality, no disturbance, they show something without interrupting or moving the viewer. In climate change photography, for example, an image that is devoid of punctum could be an aerial shot showing an entire neighborhood flooded, with just the roofs peeking out of the water, but an image with punctum would be a shot of two people carrying their dogs through the floodwaters (see Chapter 6 – image 3B). Seeing people wading through the water with their dogs cradled in their arms stands out in a different way than an establishing shot of the flood. As Barthes would say, the dogs are an “accident which pricks me (but also bruises me, is poignant to me)” (Barthes, 1981: 27). It is important to note, however, that the punctum depends on the viewer in order to be “activated”, and different people may respond to different elements of a photo as the punctum (Barthes, 1981: 42-45).

High hopes for photographs as vehicles of public engagement

Drawing on the existing criticism of the deficit model of science communication, O’Neill and Hulme (2009) demonstrated through a three-stage study conducted in the UK that individuals are much more responsive to “non-expert” icons of climate change than they are to scientific visualizations and maps. While in that study, the word “icons” refers more to the “image in the mind’s eye” of particular climate change impacts, rather than to concrete photographs, the study does show that icons “invoked an emotional response and increased understanding because of their perceived closeness to individuals’ daily lives, local area or nature” (O’Neill & Hulme, 2009: 408). This kind of emotional response is precisely what the new public engagement model is striving for: not a mechanical transmission of information from

sender to receiver, but a more complex and multilevel connection being created between subject, news reporter and public. Such a connection, it is believed, can be fostered by photographs.

Building on these characteristics of visual information processing, Leiserowitz (2006) used dual processing theory to show that images encourage a kind of “experiential” processing of information which is “holistic”, and O’Neill et al. (2013) showed that “when communicating complex concepts and abstract issues to members of the public citizenry, imagery has been an effective vehicle for meaning-making” (O’Neill et al.: 414). In a related analysis, Coleman (2010) describes how the Elaboration Likelihood Model of processing information can help to understand the power of images: when images are processed by the “peripheral” route, “ELM suggests that photographs, particularly highly evocative ones (...) will become part of a reader’s memory of [the] story, leaving an emotional trace that in time will supplant most of the written or spoken details” (239). In other words, “audiences may be more likely to accept the visual frame without question,” whereas they could more readily and explicitly engage in oppositional readings of verbal frames (Rodriguez & Dimitrova, 2011: 50). Other scholars have emphasized the role that news images can play in affecting attitudes to this pressing issue (Beattie et al., 2011; Nisbet et al., 2013).

When it comes to the public’s interaction with images of climate change, Lester & Cottle (2009) analyzed TV news images shown on six international news broadcasts during two weeks in 2004 and found that images “can convey powerful symbolic messages and appear to be performatively deployed by professional

journalists encouraging public recognition of the seriousness and the human consequences of climate change” (Lester & Cottle: 932). Thus, “the role of media images (...) appears crucial in understanding news-mediated awareness of climate change and associated ideas of ecological citizenship” (Lester & Cottle: 923). They draw on Ulrich Beck, theorizer of the “world risk society” (Beck, 1999), who argued that news images can play a crucial role in forging a cosmopolitan outlook among audiences, allowing them to “put oneself in the position of the victims, something which is also in large part a product of the mass media” (Beck, 2006: 6). This cosmopolitan outlook is necessary for the tackling of problems of many hands such as climate change. Indeed, climate change cannot be solved unless all important actors play their part; yet gridlock ensues when one actor refuses to do so until the other does. A cosmopolitan outlook overcomes such reasoning, as was for years the case between developed and developing countries, to perceive the global community as united in one common goal. Lester and Cottle’s conclusion shows how pertinent a study of the news images of climate change can be: “it is hard to imagine that climate change could have become the perceived ‘global crisis’ that it has in recent years without the help of media images symbolizing the harmful impacts of climate change on people, communities, and environments around the world” (Lester & Cottle: 921). Cottle himself further emphasizes that

images more than formally communicated ideas, it seems, often encourage affective responses and possibly help lay a foundation for a sense of moral solidarity and shared commitment. (...) When extended to the global environment, (...) images may even help to support a sense of ‘ecological citizenship’ concerned with the rights and responsibilities of the citizen of the earth. (Cottle, 2009: 85)

No one actor can be held “fairly responsible” for the “undesirable collective outcome” that is climate change (Van de Poel et al., 2012). In a situation where collective responsibility thus tends to be diffused, it is imperative that all concerned actors, vulnerable and resilient, historically high emitters and those who’ve just begun, come together to find a solution. To that end, the global flows of “images and signs may provide resources for the constitution of new identities and reimagination of solidarity and care at the global level” (Szerszynski & Toogood, 2000: 226-227).

2.3. State of the field: visual framing of climate change

Visual framing theory

Framing theory proposes that the way media messages are presented determines, at least to some degree, how audiences perceive media events. No current study employing framing analysis can get by without the standard definition offered by Entman (1993:52): to frame is to “select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described.” Note here that “text” can refer to a visual just as well as a verbal message – and Entman’s famous comparative study of the Korean Air Lines and Iran Air crashes in the 1980s notably considered the graphic elements of news magazine covers depicting the two incidents as an important element of framing (Entman, 1991: 13). Coleman (2010) defines visual framing as “the selection of one view, scene or angle when making the image, cropping, editing or selecting it” (237). Rebich-Hespanha et al. (2015) propose that visual framing

refers “to the ways in which visual imagery such as photographs (...) serve to focus attention on particular aspects or components of an issue” (Rebich-Hespanha et al., 2015: 493). Most importantly, Schwalbe warned that visual framing is not a one-off act. It begins with the assignment (where editors decide what is worth covering), followed by the choices made by the photographer on the ground; it continues back in the newsroom where pictures are selected, sized and positioned on the page (Schwalbe, 2006: 269). Crucially, Entman (1991) himself distinguished between audience frames (“mentally stored principles for information processing”) and news frames—acknowledging that both the content and the reception of media messages have to be analyzed in order to gain a full understanding of how media framing fits in to or influences existing “schemata of interpretation” among the public.

Framing analysis is particularly well suited for working with images. Although verbal framing has been analyzed much more substantially and more often than visual framing, the latter can more easily convey latent ideological messages and interpretations of events: because images have no propositional syntax, the fact that they shape the way audiences think is easily overlooked (Coleman, 2010: 243). Messaris & Abraham (2001) conclude that “the distinctive qualities of pictures make the study of visual communication especially relevant to the concerns of framing theory” (Coleman, 2010: 225). Coleman (2010) further adds that “framing theory has emerged as one of the life lines for visual research” (Coleman, 2010: 233). She also claims that “visual framing provides an important new direction for theory building and future research” (Coleman, 2010: 233). In addition, visual framing potentially exerts an important influence over how audiences interpret the news: “what we are

allowed to see has socio-political importance because mental schemas can be established and activated by the frames through which media represent issues, events and persons in the news (...)" (Perlmutter & Wagner, 2004: 102).

Messariss & Abraham (2001) studied media representations of African Americans and concluded that stereotypical depictions thereof (as lazy, dangerous, etc.), long since banned from verbal discourse, persist in visual media. Visual framing effects have been most plausibly demonstrated in experimental settings (Grabe & Bucy, 2009; Coleman & Banning, 2006; Dahmen, 2012). Such effects have been shown to exist especially with regard to the framing of political candidates and in the coverage of war (Parry, 2011; Schwalbe, 2006; Fahmy, 2010), but also relating to coverage of other controversial social problems such as stem cell research (Dahmen, 2012) and hydraulic fracturing (Sarge et al., 2015). In one example, Dahmen (2015) used a 2x3 experimental design with 150 participants who were exposed to more and less graphic photos depicting recent international crises and showed that, in the case of the American intervention in Iraq, "participants exposed to the low graphicness photo (...) expressed stronger levels of agreement than those exposed to the high graphicness photo that the United States should continue to intervene in the given situation" (Dahmen, 2015: 428). In other words, the study indicated that "photographic framing did have a significant effect" on participants' opinions of what should be done in terms of foreign policy (Dahmen, 2015: 428). This finding is extremely important, as it demonstrates that whatever incidental information or framing is carried into a news story by the photograph, it matters in the way the story is read and understood.

Visual framing of the environment

Hansen & Machin (2013: 155) note that “the public vocabulary on the environment is to a large extent a visual vocabulary” – yet “the image of nature/environment is mostly built through ads which instrumentalize it.” When it comes to environmental images circulated by the media, these are the most commonly used frames:

1. nature as wild, exotic, dangerous, symbolic of brutality and disaster (Hansen, 2002: 503)
2. nature as a resource to be controlled and exploited for recreation or industry (Remillard, 2011)
3. nature as pristine, sublime, beautiful, symbolic of aesthetic perfection, purity, authenticity (Linder, 2006; Cottle, 2000)
4. nature as under threat, a victim to protect (Cottle, 2000)

When it comes to environmental images in the news, “news organizations tend to lean toward well-trodden frames of reference to make issues more easily recognizable to audiences” (Hansen & Machin, 2008: 157). Images so generic they sometimes cannot be distinguished from commercial stock photos, Hansen & Machin (2008) show, offer “semiotic flexibility” and are globally understandable, but do not convey specific story-related information. Lester and Cottle’s (2009) analysis of television news images of climate change also notes the prevalence of highly symbolic, decontextualized images used in alerting the public about the urgency of environmental problems such as climate change. A similar pattern can be observed with news images relating to other events, such as war (Hoskins, 2004). Hansen &

Machin (2013), in their overview of recent studies about visual communication of the environment, confirm that

news and advertising images draw on a stock range of symbolic images and ones that draw on a romanticized view of nature. Visual representations of the environment tend to be decontextualized and aestheticized in ways that enhance their flexible and versatile use across different genres of communication, while also affording the basis for flexible new significations, as well as ones that are firmly anchored in culturally deep-seated/resonant discourses on nature and the environment. (Hansen & Machin, 2013: 157)

A broader criticism of the use of photographic images as vehicles for public engagement is deployed by Doyle (2009), who notes that every photo necessarily depicts past impacts at best, thus coding the phenomenon of climate change in the viewers' minds as something that has already (irreversibly) happened, not leaving much agency in their hands to do anything about it (Doyle 2009: 293). This criticism, were it taken completely at face value, would invalidate the use of photography as a means of proactive engagement altogether.

Existing visual frames of climate change

Numerous studies (O'Neill, 2013; Smith & Joffe, 2009; O'Neill & Nicholson-Cole, 2009; Lorenzoni et al., 2007) have taken stock of the various image frames circulated by the news media and some have attempted to evaluate their respective impact on viewers. Smith and Joffe (2009) examined the climate change visuals present in the British press from 2000 to 2006, and established two main categories: images of impacts and images of people. The former tended to show more and more local impacts over the years, and the latter included people reacting to impacts, politicians or opinion leaders speaking, and celebrity activists. Based on their thematic analysis

of 180 articles from three British dailies, the researchers argued that images of impacts and affected people, especially those occurring “close to home,” enhance the perception of the climate change risk as urgent and real rather than distant in both time and space. By analyzing 1603 images present in the British, American and Australian press, O’Neill (2013) found, similarly, two main visual frames: the contested frame, which mostly featured people, and the distancing frame, which showed climate change impacts in long shots of remote landscapes. Lester & Cottle (2009), in their analysis of television visuals of climate change, found that images of impacts tended to emphasize the global dimension of climate change, while images showing actors deliberating about causes and solutions grounded the problem in more nationalistic terms (Lester & Cottle, 2009:932).

A landmark study of visual frames in climate change communication is Rebich-Hespanha et al.’s investigation of climate change visuals appearing in 11 American newspapers and magazines in the 1969-2009 timeframe, published in 2015. Based on a content analysis of 350 images that appeared in a random subsample of 200 news stories, they offered the following 15 categories of climate change images: wilderness and nature recreation; citizen leaders; regular/vulnerable people; food and agriculture; impacts on polar animals and landscapes; future climate vulnerable landscapes and adaptation; storms; temperature record; view of globe from space; climate science (and scientists); government, politics and negotiation; energy efficiency; alternative energy, industry impact on the environment and, lastly, monitoring and quantifying. Some of these categories, like monitoring and quantifying greenhouse gas emissions or temperature record, are depicted in non-

photographic images like charts and maps. Based on the 350 images they analyzed, it appeared that the most common image frames are: government and politics (34 percent), science and scientists (21 percent), human contributions to climate change (21 percent), Earth warming (15 percent) and agriculture/food production (10 percent). On account of the monumental and relatively recent work accomplished by Rebich-Hespanha and her team, this thesis does not offer a separate analysis of all currently existing images. They emphasized that beyond this taxonomy of images, “more research that elucidates relationships between media images of climate change and people’s mental images of climate change and their perceptions of, attitudes toward, and intentions associated with those images (...) is much needed.” (Rebich-Hespanha et al., 2015: 515). Table 1 summarizes the extant literature on the most commonly employed visual frames of climate change in mainstream news media.

	THEME	IDENTIFIED BY
CAUSES	Agriculture/food	Rebich-Hespanha et al. (2015)
	Smokestacks/oil refinery/polluting facility	DiFrancesco & Young (2011), Rebich-Hespanha et al. (2015)
	Business people / bad actors	DiFrancesco & Young (2011)
	Transport (Cars/Traffic, Air travel)	DiFrancesco & Young (2011)
IMPACTS	Flooding	Smith & Joffe (2009), Manzo (2010), Hoijer (2010)
	Snow/Ice/Melting glaciers (incl. polar bear)	DiFrancesco & Young (2011), Smith & Joffe (2009), Rebich-Hespanha et al. (2015), Manzo (2010)
	Vulnerable individuals/victim	Rebich-Hespanha et al. (2015), Lester & Cottle (2009), Wessler et al. (2016), Hoijer (2010)
	Drought /cracked earth	Doyle (2011)
	Other extreme weather event (storm)	Brönnimann (2002)
SOLUTIONS	Celebrities	Rebich-Hespanha et al. (2015), O’Neill (2013)
	Citizen action	DiFrancesco & Young (2011), Rebich-Hespanha et al. (2015), Wessler et al. (2016)
	Renewable energy (solar, wind)	Rebich-Hespanha et al. (2015), Wessler et al. (2016)
	Politicians (speeches/negotiations)	DiFrancesco & Young (2011), Rebich-Hespanha et al. (2015), O’Neill (2013)
	Scientists	Rebich-Hespanha et al. (2015), DiFrancesco & Young (2011)

Table 2.1. Themes detected in climate change news photos by recent literature, based on the overview provided by Metag et al. (2016).

Metag et al. (2016) provide an extremely useful overview of recent analyses of climate change images, coming up with the conclusion that five broad visual frames are used in media communication about this issue: (1) impacts and threats, (2) pure nature landscapes, (3) politicians/ talking heads, (4) graphs and models (not relevant to this study), (5) images of energy – either causing carbon emissions or preventing them by using alternative fuels. Wessler et al. (2016) focused only on stories about the UN climate change conferences over a period of three years (2010-2013). They also picked up on four themes based on 432 image-illustrated articles: (1) global warming victims, (2) civil society demands, (3) political negotiations, and (4) sustainable energy frames. Though centered specifically on articles about international climate negotiations, there is a large overlap with the themes detected by Metag et al. (2016). Importantly, although most of the image analysis studies were conducted using Western media sources (though Wessler et al. included Brazilian, Indian and South African papers), researchers have found that climate change image frames are largely consistent across borders (Wessler et al., 2016).

2.4. Challenges of photographic climate change communication

Missing frames: bad actors, solutions, local impacts

An intriguing result of Rebich Hespanha et al.'s 2015 study was that while people were often represented in the surveyed images – be they climate negotiators, scientists, or victims of (predominantly distant) impacts, there were hardly any photographs of those who actively work against climate change mitigation, or those who simply profit from “business as usual” (Rebich-Hespanha et al., 2015: 22). This

is a noteworthy missing piece in the visual representation of anthropogenic climate change.

Several studies point to other such “gaps”: for instance, in an overview of the “nascent research area of the visual representations of climate change,” O’Neill & Smith (2014: 73) conclude that while climate change impacts on both people and non-human nature are often represented, successful mitigation or adaptation efforts are rarely shown (O’Neill & Smith, 2014: 77). Yet, at the same time, research would suggest that the heavily employed negative frames, such as images of pollution, destruction, etc. work against public engagement rather than help it along. Thus, the choice of images touches upon the most essential conundrum of news: should the image provided be the most “compelling,” the one that will get most clicks and attention, or should it be the one that will have a higher chance of increasing understanding of the complex issue at hand?

Another study by Myerson and Rydin (1996) suggests that images evoking fear, while effective in garnering attention, may also alienate audiences. They differentiate between two types of rhetoric that can be applied in climate change communication: one, appealing to fear, is of a more elegiac nature (mourning what is about to be lost or is already lost – see Chapter 3 for an elaboration of this frame); the other rests on hope, belonging to what they call an “ameliorative rhetoric” that reorients the focus towards the value of protecting what is there (73). A prominent study, emphatically entitled “Fear won’t do it”, demonstrated that one of the most common frames, appealing to fear, is largely ineffective in mobilizing public engagement with climate change:

on a standalone basis fear, shock, or sensationalism may promote verbal expressions and general feelings of concern but that they overwhelmingly have a “negative” impact on active engagement with climate change. That is, unless they are set in a context within which individuals are situated and to which individuals can relate, they tend to disempower and distance people from climate change. (O’Neill & Nicholson-Cole, 2009: 376)

This is confirmed by Hard & Feldman (2014), who employ the extended parallel process model of risk communication in analyzing effective climate change messaging. In brief, this model (Witte, 1992) claims that “messages about risk issues such as climate change may draw attention to the issue if strong threat information is provided but that it is critical for threat information to be accompanied by information about the efficacy of actions that individuals can take to help address the issue” (Hard & Feldman: 326). Thus, just like in public communication about security risks such as terrorist attacks or epidemic outbreaks, a consensus exists among practitioners that providing the public with knowledge about the threat must be accompanied by information on steps that can be taken to address that threat (Janoske et al., 2012). Moser & Dilling (2011) refer to well-publicized visual fear appeals such as the April 3, 2006 *Time* magazine cover picturing a polar bear image and the words “Be worried. Be very worried,” arguing that “the principal problem with fear as the main message of climate change communication is that what grabs attention (dire predictions, extreme consequences) is often not what empowers action” (Moser & Dilling, 2011: 165). Sheppard (2012) similarly showed that images depicting impacts must be accompanied by images showing solutions – the latter acting to boost feelings of efficacy among the public. The latter is vastly underrepresented in the visual framing of climate change; too often missing from view are “possible

alternative futures” like carbon-neutral power installations, people testing renewable fuels, and green city infrastructure. Yet the leap from awareness and concern, which can be expressed as the conviction that “something must be done,” to action, is the most challenging aspect of successful climate communication.

Finally, where impacts are shown, they still tend to predominantly show distant people and places suffering (usually in third world communities which are known for their low resilience to disaster). This is now changing, towards inclusion of more and more local impacts – see Chapter 4. Such images fit into the visual stereotype of developing countries as poor, unfortunate and disaster-prone; they rarely serve to boost engagement and awareness of local impacts of climate change, which may be obscured by the comparatively higher resilience of Western countries.

The salience-efficacy dilemma

O’Neill and Nicholson-Cole (2009) conducted a study measuring audience response to images according to the criteria of “salience” and “efficacy” and found that images which often proved most salient, that is heightened concern about climate change, also worked to reduce feelings of efficacy, i.e. stymied any motivation to act on the information received. One such image was the aerial view of a flooded town, and the authors conclude that “these (...) fear-inducing images tended to distance or disengage individuals, rendering them feeling helpless, overwhelmed and not empowered to act” (O’Neill et al., 2013: 414). Their conclusion emphasizes the apparent dilemma between choosing salient images or efficacious images, when communicating about climate change: “it seems imagery can play a role in either increasing the sense of importance of the issue of climate change (saliency), or in

promoting feelings of being able to do something about climate change (efficacy) – but few, if any, images seem to do both” (O’Neill et al., 2013: 420).

Kate Manzo (2010a) used a semiotic approach to analyze visual representations of climate change in British advocacy campaigns – she found a more informed use of visuals there, with clear impacts on populations and specific individuals being depicted rather than “melting ice, polar bears and non-human nature more generally.” She warns that although such iconic images as the ever-present polar bear may very well heighten people’s awareness and concern, they also desensitize audiences by making climate change seem like a remote issue, and by inspiring pity and resignation rather than motivations to act (Manzo 2010b: 198). Similarly, Hulme (2009) notes that the polar bear photographs – composing up to 6 percent of all climate change related visuals, according to a comprehensive analysis carried out by Rebich Hespanha et al. (2015) – belong to an “aesthetic of disappearance” (Hulme, 2009: 241-242). In other words, such images may carry a high emotional load but do not help audiences feel personally connected through self-efficacy.

While news photographs have great potential to combine emotion, understanding, and willingness to act responses from audiences, it is unclear at this point whether climate change photojournalism has achieved the goal of engaging the public with climate change. There are some inevitable drawbacks of photography: it is always showing the past, thus reinforcing the notion that what is lost cannot be recovered, and it is only showing one freeze frame, thus obscuring the creeping, “slow violence” aspect (Nixon, 2011) of climate change. Then, there are some pitfalls

that news outlets seem to fall into when employing photographs in climate change stories: heavily relying on appeals to fear and anxiety, privileging the use of images that do not resonate personally with readers, omitting to show the potential responses to climate change that can be a source of inspiration and forward thinking.

The next chapter offers a window into one particular visual frame, dubbed here “the apocalyptic sublime,” and examines its potential risks in engaging audiences with climate change.

3. From the spectacle of risk, to the risk of spectacle

3.1. Introduction

Can a spectacle lead to engagement?

The studies described in the preceding chapter offered precise and instructive content analyses of the existing visual narratives, or themes, present in news images of climate change, though it is important to note they focused almost exclusively on the visuals published in Western media (US, UK, Australia, Canada, Germany, Austria, Switzerland). One frame that can be detected across different themes, however, is rarely analyzed yet its importance seems crucial. This frame can be called the “apocalyptic sublime.” In this frame, climate change is presented as a grand-scale problem of overwhelming dimensions in which humans play little to no visible role. The attributes of an “apocalyptic sublime” image are defined in detail in section 3.2. Scholars have analyzed the apocalyptic dimensions of climate change rhetoric (Foust & O’Shannon Murphy, 2009; Stoekl, 2013; Jackson, 2015) as well as the sublime aesthetic in environmental images (Peeples, 2011), but so far the notion of “apocalyptic sublime” has not been applied to analyze photographic images of climate change. Since apocalyptic discourse is often evoked in connection with the issue of climate change (Foust & O’Shannon, 2009), it is worth studying the visual rhetoric of climate apocalypse and contemplating its effects. Examining the apocalyptic frame in American elite and popular press over a decade (1997-2007), Foust & O’Shannon determined two versions of apocalyptic framing: tragic apocalyptic framing which implies humans have no control over the inevitable

catastrophic fate of the planet and a more subtle, comic apocalyptic narrative whereby catastrophe is looming, but humans may be able to avert it by taking responsibility and amending their behavior. As the authors point out, the former, tragic framing is particularly ineffective in public engagement, since it “encourages belief in prophesy at the expense of practicing persuasion, even as it provokes resignation in the face of a human-induced dilemma” and it leads to a “persistent evacuation of agency” (Foust & O’Shannon, 2009: 164). This dual narrative of apocalypse is also reflected in studies of eco-apocalypse in film (see section 3.2 below). As for visual rhetoric of climate apocalypse, it is apparent that it draws both on apocalyptic rhetoric as well as on the pictorial trope of the sublime, which has its roots in humanity’s awe and terror experienced in the face of natural wonders and dangers. The following chapter is an attempt to clearly identify such images and their presence both in artistic photography and photojournalism.

One classification of climate change photos comes close to identifying this frame as applied to imagery. Lester & Cottle (2009) drew an overarching distinction of three kinds of images shown on TV news about climate change: iconic images (serving as illustrations of what is being talked about), symbolic images (used as metonymies to stand for something larger), and finally, spectacular images: those that “are deployed to seemingly invite responses of awe or dread” (Lester & Cottle, 2009: 925). Although Lester & Cottle (2009) studied television images, this last category especially applies to print news media as well. Such images, Cottle argues, can do a disservice to climate change engagement. He contends:

The spectacle of climate change visualized through the news media helps to speak to us all about this global threat and marks a crucial

development in its media career. When presented in such spectacular ways, however, the news media can all too easily position us as voyeurs only of impending catastrophe. (Cottle, 2009: 91)

These last words especially spell out caution: Cottle warns us that spectacular images of climate change may cause us to become “voyeurs only of impending catastrophe.” In other words, Cottle touches upon the idea that the more spectacular a photograph is, the more passive a response it produces in the viewer: it becomes entertainment rather than information, it inspires awe and terror and a sense of aesthetic satisfaction. Cottle does not intend to undermine spectatorship, as the general condition of people looking at things. Spectatorship need not necessarily be detrimental to engagement – on the contrary. Recent studies in the role played by photographs in weaving a visual public sphere for the good of the body politic have been conducted by Azoulay (2008) and Hariman & Lucaites (2016).

In this chapter, I am discussing those images whose end is to provide a spectacle rather than provide information. This criticism of the spectacular image falls squarely in line with Rancière’s discussion of “aesthetic efficacy” in his seminal work, *The Emancipated Spectator* (2009). Rancière draws on Kant’s definition of the beautiful as “what is represented as an object of universal delight apart from any concept” (Rancière, 2009: 64) and notes that the last part of that definition is most crucial: when presented with something that is beautiful, the viewer need not know what it is nor desire to act on it, for he or she can simply revel in its beauty. Cultural theorist Guy Debord pointed to the fact that we now inhabit a “society of spectacle” (Debord, 1994), where the images circulated by media are beginning to replace directly lived reality. As Rancière concludes, “there is no straightforward road from

the fact of looking at a spectacle to the fact of understanding the state of the world; no direct road from intellectual awareness to political action” (Rancière, 2009: 75). He observes a transition from “a representative regime of expression to an aesthetic regime” where beauty is no longer the expression of the content, but rises beyond its referent, rendering null any essential relationship to it (Rancière, 2009: 120). Orvell (2006) described a “tension between the aesthetic and the empirical” that he applied to all photographic images. He saw a conflict “between the attractive beauty of the photographic image and our dismay and revulsion at the awfulness of the subject being pictured” (Orvell, 2006: 241).

Spectacular images in environmental communication

Lester (2010) concludes from her studies of television images in six countries that at least half of the time, symbolic and spectacular images are used in the communication of environmental problems (Lester, 2010: 169). News photography used in conjunction with the topic of climate change often depicts scenes of “ruined” pristine natural beauty (most often, glaciers, polar icescapes, etc. – see Jackson, 2015), landscapes under threat of disappearance (Palmer, 2013), or sweeping industrial landscapes that show the scale and danger of human activity but are delightful in their composition and dazzling, otherworldly color patterns (sometimes referred to as the toxic sublime – see Peeples, 2011). Chapter 2 outlined the various visual themes and frames identified by researchers to date. Metag et al. (2016) in a recent study, summarized existing classifications as broadly corresponding to five major themes: (1) images of climate change impacts and threats, (2) nature themes, (3) people/talking heads, (4) models and graphs, and (5) carbon emissions/energy.

Apocalyptic sublime images can cut across the categories found by Rebich-Hespanha et al. (2015) or those identified by Metag et al. (2016): they appear most commonly as images of nature under threat, but also as images of (not-so) natural disasters such as storms and floods. Doyle (2007) performed a longitudinal study of the visual advocacy deployed by Greenpeace and found that the most commonly used photographs depict stark, arresting “already seen effects of climate change.” She finds that “this commitment to the beautiful and spectacular becomes problematic” (Doyle, 2007: 132) because it could lead to interpretations built on the feeling of “inevitable and unavoidable loss, where nostalgia for the irretrievable past is engendered by the fixing of the passing of time within the photograph” (Doyle, 2007: 144). As Moeller has noted in an analysis of the media coverage of humanitarian crises across the world, “the right images can arrest our attention, but that is just the first and perhaps the easiest step to take” (Moeller 2006: 185). Similarly, Lester & Cottle (2009: 929) contend that while moving visual scenes

may well prove essential for the formation of public awareness and growing concern, spectacle remains insufficient as a basis for processes of mobilization and political responses. Such scenes cannot substitute for the necessary public elaboration and engagement of contending environmental perspectives and discourses.

What is at stake here is the essential opposition between participation and observation, doing and watching. Naturally, the photographic medium is deeply enmeshed in the practice of looking: the subject (if there is one) may look at the camera (and subsequently, at the person viewing the photo), the photographer is looking at the scene prior to “shooting” it, and finally the viewer is observing the image. However, there are photographs that take the necessary relationship with

viewing a step further: as Jennifer Good demonstrates in the case of 9/11, some of the most widely circulated and popular images of that traumatic event were those showing not the burning towers or people running from danger, but photos showing a string of pedestrians stopped short from their daily lives, their heads turned upwards to stare in horror at the scene unfolding in front of them (Good, 2015). At the same time, scholars have noted the absence or quick removal from daily news publications of photos depicting people jumping to their death (Orvell, 2006: 250). What these editorial decisions show with regard to 9/11 is merely that the selection of photographs matters a great deal for the way an event is interpreted in the moment and later “re-imagined” in collective memory (Zelizer, 2010). The images that were not comfortable to look at were most often avoided, and those that emphasized either a spectacular apocalyptic view or a heroic “rising from the ashes” aesthetic were sent to the front pages of magazines and into glossy photo books. Tellingly, documentary photographer James Nachtwey said that a photo he took of the ruins of the WTC brought to mind the “set of a science fiction film about the apocalypse.”¹³

Apocalyptic sublime in popular culture environmental images

The apocalyptic sublime in photography does not originate from a vacuum. It is inscribed in a broader trend of climate change rhetoric in popular culture (Skrimshire, 2010; Yusoff & Gabrys, 2011: 520), on the one hand, and on a long-standing tradition of the sublime in landscape visual art, on the other. Even before climate change became the avatar and master-narrative of everything that can go wrong with the

¹³ TIME Magazine, Sept 7, 2011. “Revisiting 9/11. Unpublished Photos by James Nachtwey.” Slide 6/16.

environment, apocalyptic visions were closely associated with environmental problems. Lawrence Buell explains that “apocalypse is the single most powerful master metaphor that the contemporary environmental imagination has at its disposal.” He added that “the rhetoric of apocalypticism implies that the fate of the world hinges on the arousal of the imagination to a sense of crisis” (...) (Buell, 1995: 285). Whether this arousal serves to shake audiences out of their comfortable stupor and into an acute awareness of what they stand to lose if they don’t take action, or whether, on the contrary, it merely entrenches resigned and sometimes anticipatory expectations of the end, is a subject of much debate.

In video games, novels and films that belong to the relatively new genre of

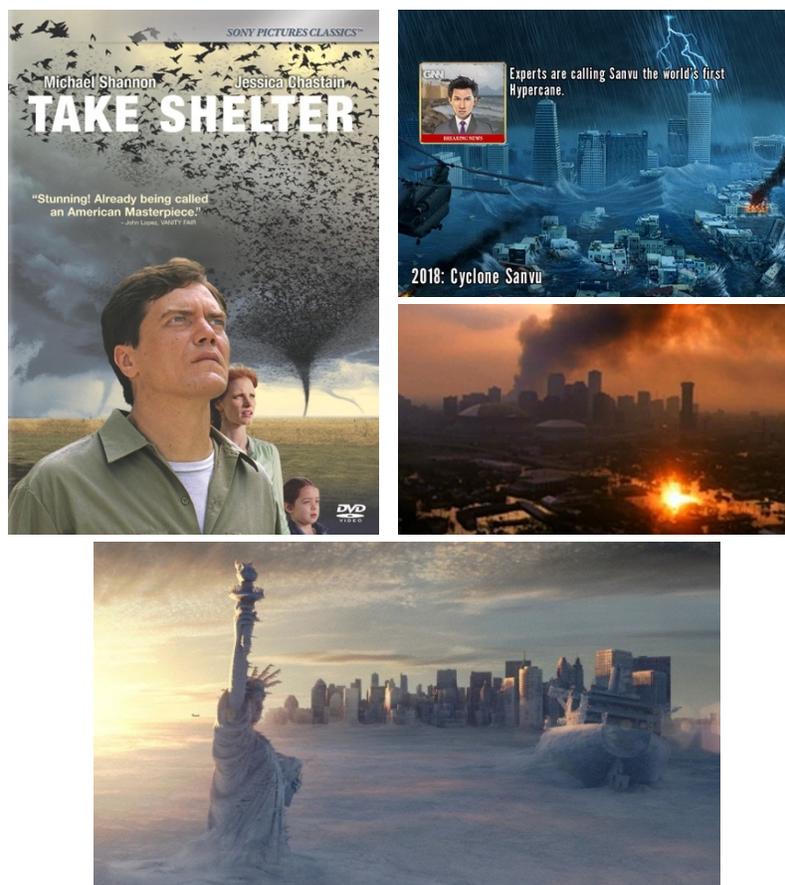


Figure 3.1 Top left: poster for the film *Take Shelter* (2011). Bottom left: screenshot from *The Day After Tomorrow* (2004). Top right: screen grab from the video game *Fate of the World* (2011) and below, the documentary, *An Inconvenient Truth* (2006).

“climate fiction”, or “cli-fi” for short (Svoboda, 2016; Kaplan, 2016; Reckien & Eisenack, 2013), visuals abound showing apocalypse either imminently approaching or already having occurred. Note the photograph chosen to represent the climate fiction movie *Take Shelter* (2011). Similarly to the 9/11 photos discussed above, it shows a family looking with fear and horror at the impending disaster, rather than just a scene of the disaster itself. Observe also the similarity between the photograph of New Orleans during Katrina, used by Al Gore in his blockbuster documentary on climate change, and the computer generated apocalyptic vision of New York City in *The Day After Tomorrow* (2004). Gore’s 2006 documentary *An Inconvenient Truth* is one of the first occasions of visual climate change communication reaching mass consciousness. It was rife with apocalyptic sublime images, drawn from Hurricane Katrina or showing polar bears struggling to find solid ice in the melting Arctic. Similarly, in artistic photography, this spectacular aesthetic is well-established. In previous work (Nurmis, 2016), I attempted to show that curators of climate change art exhibition often refer to these images as nothing short of cathartic. Curator Amy Ingrid Schlegel writes of a series of paintings in the exhibition *Seeing Glacial Time* held in 2014 at Tufts University: “These beautiful yet ominous paintings offer both a premonition and a requiem for a fragile environment— a melancholic Sublime’. Al Gore made this connection explicit during an interview at *The Today Show*, saying: “These storms –it’s like a nature hike through the Book of Revelation on the news every day now. People are connecting the dots.”¹⁴ Dunaway (2015) describes in detail how the powerful, poignant imagery of the documentary did a great service to

¹⁴ Today Show, January 29, 2013. Interview with Matt Lauer.

the cause of climate change awareness, bringing the problem to the attention of mainstream media, yet offered merely therapeutic, consumerist remedies such as purchasing high efficiency light bulbs, and failed to discuss the environmental justice aspect of global warming (Dunaway, 2015: 268-269).

Outline of this chapter

This chapter will first aim to provide a comprehensive definition of images that can be called “apocalyptic sublime” images, and will then expand on their use in fine art photography of climate change. Indeed, Zelizer (2006) observed that photographic images travel easily between their various uses in advertising, art, law, journalism and other domains of culture. She especially noted that news images “constitute the bedrock of much of the visual transport across the popular domains of collective experience” (Zelizer, 2006: 13). This chapter fills an important gap in considering news images as part of a continuum, notably in their connection with fine art photography. The latter is especially rife with apocalyptic sublime images of climate change, and the fact that such images also appear prominently in photojournalism is intriguing and should be the subject of more detailed scholarly inquiry. The final part of the chapter thus applies the definition of apocalyptic sublime images to recent, front-page, above the fold images from prominent American newspapers.

3.2. Defining an apocalyptic sublime image of climate change

The origins of the apocalyptic sublime in painting

In 1986, art historian and literature critic Morton Paley described 18th and 19th century British artists’ penchant for painting vast natural landscapes of doom and

destruction as the “apocalyptic sublime” (Paley, 1986; see also Cook, 2012), thus coining the term used throughout this chapter. Among painters who represent this trend are William Blake, J.M.W. Turner and John Martin, all known for painting scenes directly inspired by the biblical Book of Revelation. Martin’s triptych entitled *The Last Judgment* was extremely popular in its day, shown to millions of people of different social standing, in several countries; it was considered “morally uplifting entertainment” (Myrone, 2013). More recently, cultural and art theorist Paul Virilio also employed the term “apocalyptic sublime” signifying “art’s association with a mode of creativity involving portents of widespread devastation and ultimate doom” (Virilio, 2007; Garnett & Armitage, 2011: 9). Garnett & Armitage observe that the apocalyptic sublime is also firmly embedded in contemporary art practice, a stream of work that depicts the “metaphysical states of combined awe and horror in face of immense natural or supernatural forces” (Garnett & Armitage, 2011: 10).

The original apocalyptic sublime referred to grandiose scenes depicting either the sheer scale and complexity of nature or a looming natural disaster. With climate change images, there is an added twist: they depict similar disasters, yet the term “natural” does not fully apply. Indeed, these “natural disasters” are thought to be in part anthropogenic, a temporally distant though directly traceable effect of human activities. Images showing these disasters – the image of the flood is the most common one – can be described using the words “arresting”, “awe-inspiring”, and carry with them both a sense of delight and a sense of fear. Paley describes the work of several artists, whose apocalyptic sublime paintings either show scenes from the deluge in the Old Testament, or episodes from the Book of Revelation. One of the

most influential traditions established in the painterly tradition of the deluge, depicted as a biblical event, started with Poussin, whose *Deluge*, painted in 1660-1664 “is a *landscape* as none of its predecessors is” (Paley, 1986: 8). The deluge may stand in for other kinds of extreme weather events, such as a hurricane (in recent times, Hurricane Sandy or Katrina). The apocalyptic sublime tradition established by early romantic painters of this Old Testament end-of-the-world event is that of a dark, ominous landscape in which human figures, usually placed in a corner of the canvas, are but tiny, passive victims who serve both to focus the viewer’s attention and to indicate the overwhelming scale of nature compared to man. In comparison, the scenes from Revelation are much more centered on important figures such as angels, demons, fantastic beasts, the Virgin Mary, etc. who are entangled in the final epic battle of good against evil, or human beings subjected to the last judgment. These two modes of the Apocalypse, as either hopeless annihilation (Old Testament) or decisive event leading to a new and better world (Revelation), are mirrored in later visual representations that subscribe to the apocalyptic sublime mode, including environmental images. However, as Hammond & Ortega Breton (2016) suggest, contemporary fascination with apocalyptic themes in fiction, film, and visual culture in general subscribes rather to the Old Testament vision of the deluge, where individuals are (but for a few) all victims and passive onlookers of the destruction around them, rather than actors wrestling with the forces of good and evil in the hopes of ushering in a better, more sustainable and just world.

Thus, apocalyptic visions can be past-oriented, in that they describe an existing world order collapsing or about to collapse, never to return, or they can be

future-oriented, like those from the Book of Revelation, which announces a new earth, and a new, better world order. This distinction closely mirrors the one mentioned above, between the “tragic” and “comic” mode of apocalypse. The latter is almost entirely absent from current media images, perhaps because such a vision implies a necessity for groundbreaking transformation of the way society operates. A “positive” rhetoric of apocalypse, one that interprets apocalypse as a new world order, would imply – as many environmentalists and even economists have been arguing for years – a shift away from the principle of prosperity as founded on continuous GDP growth (Levene, 2013). Yet, as Dunaway demonstrates in his book *Seeing Green* (2015), much of the recent visual rhetoric of environmental preservation rather encourages small scale, individual solutions to environmental problems that fit into the model of green consumerism (for example, recycling or buying “green” products) rather than opening up public imagination to visions of alternative societal organization not based on limitless consumption.

Operational criteria for apocalyptic sublime images

For the purposes of this chapter, the following attributes will be defined as sufficient, though not necessary, for a photograph to be called “sublime apocalyptic”:

1. Aesthetically pleasing composition
2. Broad scale (wide-angle shot, often bird’s eye view)
3. Depicts some form of disaster or destruction (impending, occurring, or aftermath)
4. Distant from everyday life experiences
5. If humans are visible, they are not shown to be active but passive

Each of these elements warrants some explanation. The first element is the most important: all apocalyptic sublime images are beautiful to look at. This is achieved by using the rule of thirds, picking one “anchoring” element in the photo to draw the gaze and to show the scale, including a vanishing point to add more depth to the photo, and carefully balancing colors and tones to provide harmony, whether in monochrome or color prints. When images are made this way, they provoke a certain sense of “awe” in the viewer, awakening his or her aesthetic sensibility. These photos might be referred to by photo editors or photographic competition jury members as “compelling,” “breathtaking,” or “arresting.” Next, these images rarely focus on a single home or person, but rather, in the vein of British landscape paintings falling under the same category, show a vast landscape at a considerable distance. What is occurring in this landscape must be threatening, for the image to qualify as apocalyptic sublime – potentially resulting in the collapse of an entire city, ecosystem, country, etc. A corollary is that the image presents something far removed from everyday life. It is an image showing something overwhelming and novel. An image causing the viewer to question the very stability of his or her life-system. Crucially, however, the apocalyptic sublime image only functions as long as the destruction depicted is not a real, immediate threat to the person contemplating the picture. As one of the first philosophers to describe the sublime aesthetic, Edmund Burke defined the necessary distance from actual danger, which must be preserved in order for aesthetic pleasure to be felt:

the passions which belong to self-preservation, turn on pain and danger; they are simply painful when their causes immediately affect us; they are delightful when we have an idea of pain and danger, without being

actually in such circumstances; this delight I have not called pleasure, because it turns on pain, and because it is different enough from any idea of positive pleasure. Whatever excites this delight, I call *sublime*. (Burke, 1756: Part I, section VII).

This specificity of the sublime aesthetic is extremely important in understanding how apocalyptic sublime images of climate change work: the destruction and danger they display is always presented to the viewer at a safe distance from the actual danger.

This is only compounded by the fact that such images will rarely show humans and if they do, humans are either portrayed at a large distance, making them look insignificant, or they are merely victims of the disaster depicted.

3.3. The sublime apocalyptic aesthetic of climate change in fine art photography

The flourishing of Anthropocene art

Since the onset of the 21st century, there has been a flourishing of visual and installation art that can be called “climate change art” on account of its subject matter (Nurmis, 2016; Walsh, 2015; Yusoff & Gabrys, 2011; Miles, 2010; Knebusch, 2007).

This term covers a broad spectrum of work, from activist art by organizations such as Greenpeace, through middle-of-the-road art presented to the public outside of the traditional gallery setting, such as installations by Olafur Eliasson during the international climate conferences in Copenhagen and Paris, to fine art housed in museums like the Royal Gallery in Amsterdam. Although the explicitly stated motivations behind each body of artwork differ greatly, scholars and art critics recognize such works as belonging to the wider field of “the art of the Anthropocene” (Davis, 2015), by which they mean the new geological era, about to be formally recognized as having followed the Holocene: the era of humans’ indelible influence over the planetary ecosystem (Szerszynski, 2012).

Here, it is worth pausing on the concept of the Anthropocene, and the newly minted genre of Anthropocene art, since it is closely related to the traditional idea of the sublime, while operating an important reversal of this idea at the same time. The Anthropocene as a new geological epoch, now appearing to crystalize in official scientific circles, is related to the notion of the sublime in art: whereas the original, 18th century sublime art relates to the feeling of dread and awe felt in the face of nature's overwhelming grandeur and force, with the Anthropocene, artists place the public (and themselves) face to face with a man-made sublime: the awesome force to be marveled at and feared is now humankind itself. The first twist on sublime art as no longer originating in nature, but in the power of humankind itself occurred already in the late 19th and early 20th century with the emergence of the so-called "industrial/technological sublime" art, showing both in painting and photography the overwhelming, cold, sometimes brutal, but inspiring achievements of engineering and industry (Nye, 1994). The added twist with climate change art, however, is that nature is once again the main subject being portrayed and marveled at: however, the power of nature to be feared is precisely a menace because of what humans have done to change it, through the use of fossil fuels, at a systemic level. Among these artworks of the Anthropocene, apocalyptic sublime images are common (Nurmis, 2016; Dunaway, 2009; Palmer, 2013).

Engagement with climate change: the artists' goal?

When interviewed, many artists frame the reasoning behind their works in terms that closely resemble a sense of mission to engage the public with climate change so that measures can be taken to halt catastrophic warming. Yet, the images they produce as

a result often fall into the category of “apocalyptic sublime” images, and are described as such by curators. As an example, Todd Bartel, curator of the exhibit *Sublime Climate* held in 2007 at the Thompson Gallery in the Cambridge School at Weston, explains the choice of the word “sublime” in the exhibition title:

For the Romantic poet and painter, the sublime in nature was a driving concept. (...) the thought of humankind effecting change in nature was once, and not too long ago, considered hubris. All these senses play eerily on the mind as we consider a new kind of sublime: the combined impact of our collective actions upon this planet since that past century is adding up to a scale so vast, it is ironic we just could not see it coming. Like a preadolescence, modernism did not foresee its impact, and for far too long this recognition was below the threshold of perception.

Bartel concludes his statement by expressing hope for the effects of the art on viewers:

Unlike the explorers of previous centuries who helped to pioneer visualizations of the seemingly limitless sublime, we twenty-first century pioneers of the new sublime are acutely aware of our own limits and the threat is far more real than romantically understood thoughts of immensity and abundance. (...) And what can we do, so that we can endure along with our ways of life? The climate these artists hope to affect is one in which peoples united are motivated to make changes right now.

This quote is particularly revealing, since it combines an expression of fascination with the sublime with a motivation-driven approach to climate change art, as a form of communication that will move people to “make changes right now.” Apart from large-scale industrial mining and landfill or waste aggregations, one of the most frequent subjects for the apocalyptic sublime in climate change art has been ice and the accelerated changes it goes through due to climate change. Two exhibits of note, *Seeing Glacial Time* (Tufts University Art Gallery, 2014) and *Vanishing Ice*, (Whatcom Museum,

2013) make no secret of the connection between icescapes and the sublime visual rhetoric of destruction in a context of climate change. For instance, Barbara Matilsky, curator of the *Vanishing Ice* exhibit, states the subject in the following terms:

Vanishing Ice will reveal the transformative power of art in shaping the public's perception of these starkly beautiful environments. Beginning in the eighteenth century, writers and painters, such as Francois-August Biard (French, 1799–1882), and Frederic Edwin Church (American, 1826–1900) contributed to a new appreciation of alpine and polar landscapes, which were once regarded with fear and now experienced on a heightened, emotional level. This quality, described as the Sublime, intersected with spirituality and was one of the defining aspects of a culture in the throes of rapid industrialization. Polar ice and glaciated mountains became metaphors for both the control of nature and correspondingly lack of control, freedom, nationalism, and more recently climate change.

Numerous curatorial narratives for exhibits based on the depiction of ice in art feature this same rhetoric, exemplified here by Matilsky and in the quote mentioned above by Amy Ingrid Schlegel. In essence, the apocalyptic sublime icescape is identified and recognized by two main attributes: 1) the unspeakable beauty of the glacial landscape and 2) evidence of a threat looming over it. Sometimes, that threat is identifiable in the picture, but more often than not it is only articulated in the caption, with the image itself looking to the untrained eye like an undisturbed natural landscape. In the case of industrial site or landfill photographs, the combination also consists of two seemingly contradictory attributes of the image, which curators are quick to point out: 1) the sheer scale of the damage inflicted upon an ecosystem and 2) the surprising, eerie beauty of the site as seen from a bird's eye view.

Close analysis of apocalyptic sublime art photography

In the section that follows, a few artists' works that fall squarely into the category of "apocalyptic sublime" will be analyzed, as well as the accompanying discourse from the artists themselves, curators, and critics. The three artists chosen here each represent a different kind of sublime apocalyptic vision of climate change: first, images showing man's deeply transformational activity destabilizing the earth, second, those showing natural landscapes where something has gone wrong, presumably due to climate change, and lastly, pictures of nature's "revenge" in extreme weather events whose frequency and strength may be attributed to man-made climate change. This discussion will lead into an analysis of apocalyptic sublime images of climate change on the front pages of national newspapers. The ensuing discussion will wrestle with the question of whether the boundaries between artistic and journalistic images of climate change are increasingly porous, and what that may mean for climate change engagement.

David Maisel



Figure 3.2 David Maisel's Black Maps. Left: Bagdad, Arizona 3, 1985. Right: Pima, Arizona 5, 1985.

David Maisel (American, b. 1961) photographs the results of mining and logging from the air. One album of his photographs, published in 2013 by Steidl, is explicitly titled *Black Maps: American Landscape and the Apocalyptic Sublime*. His photos are typically shot from a Cessna airplane using a medium-format camera.

The discourse surrounding Maisel's work, both from curators, the artist himself, and reviewers of his work, merits some analysis. The official description of Maisel's 2013 solo exhibit, aptly titled – *Black Maps: American Landscape and the Apocalyptic Sublime* – at the CU Art Museum in Boulder, CO, highlights the combination of “sublime beauty and apocalyptic destruction” evoked by the 28 large-format photographs of human activity transforming the American landscape. In the Fall 2003 issue of *Aperture* magazine, a review article was devoted to Maisel's work, tellingly titled: *Immaculate Destruction*. Author Diana Gaston writes of Maisel's *Lake Project* series: “From the air, high above this damaged wasteland, the ground

assembles itself into something spectacular and horrifying.” In this statement, the traditional meaning of the aesthetic sublime is clearly referred to, as something that in Edmund Burke’s words arouses both “delight” and “terror.” As described by JD Talasek, curator of the exhibit *Imagining Deep Time* where Maisel’s *Black Maps* series was also featured, “the absence of easily recognizable points of reference within the image eliminates any sense of scale, causing the viewer’s mind to oscillate between the damaged landscape and the beautiful abstract composition” (NAS, 2014: section entitled “Cultural and Personal Relationships with Deep Time”). While on the one hand Maisel’s work is pioneering in that he travels to remote sites where regular people would never go, and thus his work is essential because it shows the large-scale transformation of the Earth by human industry, the form in which he does it is highly aestheticized, and precisely that lack of scale and painterly quality of his photographs can be a source of aesthetic delight before it is a source of new knowledge.

Susannah Sayler & Edward Morris



Figure 3.3 Sayler / Morris for the Canary Project, Glacial, Icecap and Permafrost Melting. LEFT: LIX: Lake Paron, Peru, 2008. RIGHT: XXXVI: Bellingshause Base, King George Island, Antarctica, 2008. Source: Sayler / Morris.

In 2006, after reading a series of essays on climate change by Elizabeth Kolbert, Saylor & Morris formed the Canary Project with the aim of documenting the effects of climate change on natural landscapes. The evolution of their work from just a series of photographs entitled *A History of the Future* to founding an artist/activist collective employing multiple media is noteworthy: they never claimed nor hoped to avoid being labeled activists and are openly campaigning through their work for climate change action. Their self-proclaimed motivation is to “find out if photographs could make us or anybody else more seriously invest in the proposition that climate change is real, urgent and a serious risk to life” (Morris & Saylor, 2015: 300). In their view, the fact that their photographs produce a feeling of “awe” usually experienced in an encounter with the sublime, leads to hope that viewers can move beyond that initial reaction of awe, or fear, to a sense of urgency or even anger. In a revealing quote, Edward Morris articulates this belief: “What’s not good is if fear stays as fear. What you want to do is translate fear into some sense of urgency, or even anger. That’s how a movement takes root. But without the fear, there’s usually no motivating force.” (Keefe Rhodes, 2012).

In a chapter they contributed to the volume *Image Politics of Climate Change* (Schneider & Nocke, 2014), the artists make a distinction between illustrative and pensive images. The former, like most journalistic images, are illustrative, in that their value is derived from the medium’s indexicality – they deliver visual evidence of a “this was there then.” The latter, while also rooted in the indexicality of the photograph, are not tied to the superficial function of providing evidence – they are contemplative, not subordinate to verbal explanations, indeterminate (Morris &

Sayler, 2015: 316-317). This distinction, which Morris & Sayler draw from Rancière, is not unlike that made by Caple (2013) and Harrison (2003) when discussing the representational metafunction of photographs: an image can be narrative, depicting an action or event going on, or conceptual, showing something that is representative of a larger idea. Morris and Sayler claim that their photographs, rare examples of images belonging to the pensive category, can “help us get closer to the trauma of climate change” (Morris & Sayler, 2015: 318) or “make a space for belief” (Morris & Sayler, 2015: 314) where so far there is only knowledge. Because photography activates a more immediate and emotion-driven form of understanding (Graber, 1996) than text, it has been hailed as a potential way of bridging the paradoxical gap between knowledge and belief. Slavoj Žižek eloquently described this gap: “Our attitude here is that of the fetishistic split. ‘I know very well (that global climate change is a threat to the entire humanity), but nonetheless [...] I cannot really believe it.’” (Žižek, 2010: 445-446). Sayler & Morris’ argument is that the pensive images they produce can serve to slowly but surely convince the public that the trauma of climate change is a real possibility – in other terms, to help people believe in it and act accordingly. As a contrast, they claim that illustrative (i.e., merely factual or journalistic) images can only present factual evidence, thus helping to demonstrate the accuracy of the science: helping people to know, but not providing enough for them to believe. Yet what Sayler and Morris seemingly fail to notice is that their pensive photographs, by offering an encounter with the potential trauma of climate change that is both sublime and apocalyptic, that is, inspires fear as well as delight, do nothing or very little to dislocate the continued comfort of one’s participation in business as usual. Gazing at

Morris & Sayler's beautiful, haunting photographs, one indeed does not see them as "subordinate to text" –no caption is needed, but whether the reflection sparked by the photo leads to an opening up of the viewer's belief in the traumatic potential of climate change is questionable. As Rancière points out in the opening lines of his chapter on "The Pensive Image": "the adjective ([pensive]) describes a curious condition: someone who is pensive is 'full of thoughts,' but this does not mean that she is thinking them. In pensiveness, the act of thinking seems to be encroached upon by a certain passivity" (Rancière, 2009: 107). Indeed, the word "passivity" is key here, and I argue that the catharsis rendered possible by encountering these "pensive" sublime apocalyptic images results in an unaltered state of engagement. Indeed, the experience of catharsis provides a semblance of "action" having occurred: the cleansing, therapeutic encounter with trauma which has not been actually encountered, but nonetheless appears to be resolved. Sometimes, passive spectatorship is a way of creating a collective understanding of an issue and conquering trauma, as Morris & Sayler suggest. This kind of cleansing may be beneficial in some cases; for instance, author Jennifer Good notes of the 9/11 photographs that they were a way for the public to assimilate and come to terms with the catastrophic attack that defied explanation in words (Good, 2015: 54). This healing potential of photography with regard to past traumatic events, helping fix them in collective memory and at the same time overcome them, is well documented (Zelizer, 1998; Hariman & Lucaites, 2003). There is an obvious and important difference between photographs of 9/11 and of climate change, however: using photography to help people "come to terms with the trauma" of climate change can

only enshrine the status quo of burning fossil fuels, thus setting in motion a self-fulfilling prophecy of catastrophic warming.

Sasha Bezzubov



Figure 3.4. From “Things Fall Apart”; LEFT: Hurricane #4, Florida (2006); RIGHT: Earthquake #3, India (2001).

New York-based photographer Sasha Bezzubov (b. 1965, Ukraine) represents yet another kind of apocalyptic sublime fine art photography of climate change. In his 2001-2007 series, *Things Fall Apart*, large format prints show the worldwide effects of (un)natural disasters – extreme weather events whose causes are at least in part attributable to man-made climate change. In his artist statement for the series, he expresses fascination with images that can produce both a sense of delight (rooted in their aesthetic quality) and a sense of dread (based on the scene they show and what it implies for future impacts – such images can be called harbinger images). A part of his statement reads as follows:

(...) these photographs evidence the fragility of the man-made as it is transformed into dreamscapes of apocalyptic proportions. I derive a guilty pleasure from witnessing and representing ruins. Images of destruction are beautiful because there is pleasure in knowing a kind of truth, the truth of fragility and impermanence. But there is suffering

buried in these images, the suffering of others, and by extension, of ourselves.¹⁵

In the journal *Places*, Aaron Rothman picks up on the sublime landscape art tradition into which Bezzubov steps with his works, while noting the disturbing quality of the photos depicting results of natural (though in some respect, also man-made) disasters. He writes the following of Bezzubov's photos: "Nature's power is certainly evident in Bezzubov's images, but the knowledge that human-caused climate change has increased the frequency and strength of catastrophic storms reshapes our sense of the sublime" (Rothman, 2014).

In case the reader is wondering what these fine art photographers may have in common with photojournalists, Bezzubov is one of many photographers who crosses the boundaries between editorial and artistic work frequently: in October 2009 he was commissioned to take climate change photographs for the *New York Times Magazine*.¹⁶ Indeed, there is no strict separation between art photographers and photojournalists; the same people often produce both kinds of work. Another photographer who specializes in the apocalyptic sublime, Colin Finlay, presents himself to the public outright as a photojournalist, not an artist. A *Wired* magazine review of his work describes it almost precisely as what has been identified here as the apocalyptic sublime: "from the tar sands of Alberta to the soda ash in Kenya's Lake Magadi, the pictures are mesmerizing to see but terrible to consider" (Bierend, 2014). Yet, Finlay's expressly stated aim in sharing his images is a call to action:

¹⁵Bezzubov, S. *Things Fall Apart*. Artist Statement. <http://www.sashabezzubov.com/projects/things-fall-apart/statement> [Accessed January 6, 2017]

¹⁶Bezzubov, S. & Wollan, M. "Out of the Ashes", Oct 25. 2009, *The New York Times Magazine*.

“That’s the most important question that I can ever put forth in any photograph,” he says. “Is anyone looking at that photograph going to say ‘how can I make a difference?’” (Bierend, 2014). Thus, in photographic communication more so than in verbal communication, the boundaries between art, journalism, and activism can sometimes be very porous; one person could be doing all three at the same time.

Apocalyptic sublime in fine art photography: conclusion

Many other art photographers could have been profiled here: for example, Diane Burko, Chiara Goia, Subhankar Banerjee, or Jean de Pomereu. This discussion of visual climate change art that subscribes to the sublime apocalyptic mode of representation was carried out for two reasons: Firstly, the medium discussed here is photography, and traditional visual studies and art criticism has much to say about how this medium operates, a disciplinary toolbox which is often overlooked by media studies scholars. Secondly, as the following section will show, this sublime apocalyptic photographic aesthetic has seeped through the porous boundaries between art photography and photojournalism and is especially prevalent in climate change reporting. For example, Subhankar Banerjee, one of the photographers mentioned above, took photographs of polar bears for the Associated Press, which were published in *The New York Times* in 2009.¹⁷

Nothing indicates that the sublime apocalyptic mode could help bridge that notorious gap between knowledge and belief, maintaining the viewer as it does in a suspended state of awe and dread, a state that effects its own reward, thwarting the

¹⁷ Revkin, Andrew. C. “U.S. Curbs use of Species Act in Protecting Polar Bear”, May 8, A13, *The New York Times*.

need for further concern or action. Craps (2003) noted about the main character in Swift's novel, *Out of this World*, that he was greatly frustrated as a photojournalist by the "sinister pseudo-catharsis offered by photography" (Craps, 2003: 305) and that pseudo-catharsis is precisely what apocalyptic sublime climate change imagery seems to offer.

3.4. Page One and the apocalyptic sublime climate photo

Is the medium itself inherently past-oriented?

It is a given assumption of this thesis, especially considering the year in which it is being written (2017), that decisive action at all levels – individual, local, national, and international is more urgent than ever to halt or at least slow down catastrophic warming. Indeed, a report published in *Nature* in 2016 estimated that despite the "success" of the Paris climate summit in December 2015, it is very likely that the Earth will reach 3 degrees warming by 2100. This means that the threshold of dangerous warming will be crossed despite governments congratulating themselves on committing to historical emissions reductions. Therefore, it seems there is a risk of lost opportunity when visual imagery of climate change in mainstream media replicates apocalyptic sublime artistic photographs, which invite contemplation and produce a pseudo-catharsis. As Julie Doyle observed, one of the trappings of climate change photos can be that because they show losses already under way, the implication for viewers is that climate change is something having already happened with irreversible consequences, a *fait accompli*. She explains: "photographs of retreating glaciers depict an already affected environment, illustrating the current reality of climate change through the image, and at the same time signifying the

failure of preventative action required to halt its acceleration.” (Doyle, 2009: 280). Doyle’s point is a broader one about any image depicting the already seen effects of climate change. As Marianne Hirsch (2002) observed, photos are “inherently elegiac” because of the way they freeze a slice of past time into a frame. It could be argued that since photos of climate change impacts necessarily show the past, their influence on changing people’s attitudes and heightening feelings of self-efficiency can be weak at best. In general, one objection to the criticism of apocalyptic sublime images could be that any photograph necessarily aestheticizes its referent object to some degree. This was already noted in 1934 by Walter Benjamin, who observed in “The Author as Producer” that [Photography] (...) is now incapable of photographing a tenement or a rubbish heap without transfiguring it. Not to mention a river dam or an electric cable factory: in front of these, photography can now only say, ‘How beautiful!’” (Benjamin 1982: 24). However, such an objection can be easily overturned, since the scope of images of any given event can vary greatly on the spectrum that stretches from “strict documentarian” to “strictly aesthetic.”

As a case in point, let us turn to the most prized field in photojournalism: war photography. Both the photographs by professional photojournalists shown in Figure 5 depict an exhausted American soldier in Afghanistan after a grueling mission. The soldier in the photos is not the same person, but could be: his expression is the same (eyes closed, mouth slightly open, limbs resting). The photo on the left is a color photo centered on the soldier, shot at eye-level, with another soldier’s leg included in the photo. The one on the right, however, is profoundly aestheticized: first of all, it is black and white with deep shadows. It uses “vignetting” – darkened corners of the

image providing a “spotlight” effect. Regardless of which image is preferred, it is clear that the one on the right is the “transfigured” depiction of the exhausted soldier, in Benjamin’s terms, whereas the one on the left is a straightforward documentary shot of the same subject.



Figure 3.5. Left: Exhausted 18 year old American soldier from the 1st Infantry Division on the floor after completing a 11.5 hour combat mission to search for weapons caches in the Alaugal valley in Nishagam, in Afghanistan’s eastern Kunar province (Getty). Right: American soldier collapses in exhaustion. Korengal valley, Afghanistan 2007. (Balazs Gardi)

Photojournalism of climate change can act as a warning; showing the public views of situations that can be considered “harbingers” of future climate change. It can act “against the contemplative aesthetic in encouraging an active response in the world, thus moving the experience of viewing from the distance of aesthetic perception to the engaged activity of the respondent to disaster” (Orvell, 2006: 253). By seeing climate change refugees or destroyed houses, the public that has not (yet) been affected in any meaningful way by catastrophic warming can more easily imagine what the future might bring for them, too. In a recent interview, *The New York Times* photographer Josh Haner, who specializes in producing in-depth climate change visual packages for the newspaper, acknowledged:

The eight locations we focused on this year showed me some of the ways our world is changing. These are on a micro scale right now, but

we need to think about what happens when rising seas affect a place like Miami. Maybe we can use some of the lessons that we're learning in these eight places to help us better prepare when that becomes our reality. (Estrin, 2016)

Manzo (2010) discusses the way both “fingerprint” and “harbinger” images have been used by environmental advocacy groups to motivate more people to take action. Yet focusing attention only on impacts, whether past or present, distant or local, results in a body of work that “mirrors the tones of contemporary discourse, which are fear, misery and doom” (Manzo, 2010: 99).

Why apocalyptic sublime images are likely to stall engagement

Crisis and risk communication research suggests (Witte, 1992; Covello, 1998) that causing alarm alone by showing negative events may well raise concern, but does almost nothing to motivate action in the long run. This approach is based on the theory of the extended parallel process model, which suggests that combining messages of fear with information about efficacy leads individuals to take on a “danger control” approach, whereby they are motivated to take action to reduce the threat (Cho & Witte, 2005). Confirming this principle in climate communication, Feldman and Sol-Hart (2015) conducted an online experimental study, presenting four variations of a climate change news story (though without photos) to respondents, including either no efficacy information, internal efficacy (individual action), external efficacy (political action) or response efficacy (effectiveness of a particular policy). They found that “messages that emphasize the internal, external, or response efficacy of climate change actions can influence emotions,” more than “a message that discusses only the negative impacts of climate change” (Feldman

and Sol-Hart, 2015:16). Moser (2009: 293) builds on this knowledge by admonishing climate communicators to include messages of efficacy alongside messages of alarm:

rather than inundate audiences with more information or scary images of a gloom-and-doom future, it is critical now for communicators to constructively engage and support individuals and communities by creating a sense of feasibility, collectivity, and urgency arising from fact, experience, common sense, and a moral sense of responsibility.



Figure 3.6 Left: TIME cover, Apr. 3, 2006 (photo). Center: Front page of the New York Times Sunday Review section, Nov. 25, 2012 (illustration). Right: Newsweek European edition cover, June 12, 2015 (photo).

Spectacular photographs showing destruction or loss of natural beauty as a result of climate change, in addition, are often a source of aesthetic satisfaction for the viewer. As law professor Edward Rubin observed, “redefining our sense of right and wrong is always uncomfortable. It is much more pleasant to imagine the entire world in ruins than to recognize that our familiar sense of good behavior has become dilapidated, and needs to be replaced.”¹⁸ Apocalyptic imagery, along with the associated verbal

¹⁸ Rubin, Edward L. March 26, 2015. „Our end-of-the-world obsession is killing us: Climate denial and the apocalypse, GOP-style”, Salon.com,

rhetoric of the “end times,” is well established among illustrations related to climate change published as full page covers of news magazines. Figure 6 shows three cases in point, spanning the 2006-2016 decade. All three of these covers can be classified as “doomsday” both in their visual and verbal rhetoric. The TIME cover photograph is heavily altered by placing a spotlight on the polar bear, thus creating a strong vignette effect adding an ominous aura to the entire image. It is worth noting that the rather long text paragraph overlaid on this image bears hardly any direct relation to the image content: “Climate change isn’t some vague future problem – it’s already damaging the planet at an alarming pace. Here’s how it affects you, your children, and their kids as well.” As for the two other cover images, they both mention the word “end” in their headlines: “Is this the End?” on the *New York Times Sunday Review* cover and “(...) Eskimos ask if the world is ending” in the subtitle of the *Newsweek* cover.

Yet, it is one thing for such photos or illustrations to appear on front pages or covers of news magazines, attracting readers’ attention to in-depth, analytical cover stories about climate change. It is another if daily newspapers use such sublime apocalyptic imagery on the front pages of their nationally distributed editions. Therefore, this chapter will present an examination of several newspaper front pages from recent years centering on climate change.

http://www.salon.com/2015/03/26/our_end_of_the_world_obsession_is_killing_us_climate_denial_and_the_apocalypse_gop_style/ [accessed May 13, 2016]

Apocalyptic sublime images of climate change on front pages

Front pages are arguably the most important way a newspaper sets the agenda for the day, and the photo featured usually in a central position across three to five columns above the fold enjoys high visibility in the public square. Indeed, eye-tracking studies tracking user's interaction with newspapers determined that the main photo is the most common "point of entry" for a person reading the newspaper, followed by the attached headline and then the second most prominent photo on the page (Holsanova, Holmqvist and Rahm, 2006). Considering that the photograph placed in large size and color in the prized "above the fold" position is the first (and possibly the only) item of any given day's edition that potential readers will see, the choice of the front page photograph is arguably the most important one in daily editor meetings.



Figure 3.7 The New York Times front page, October 31, 2012. Main photograph by Kirsten Luce for The New York Times

In this first case, a full-width image occupies the whole prime position “above the fold.” The image proportions are remarkably similar to a cinematographic format (16:9) rather than the standard 3:2 format produced by a camera sensor, adding a sense of “spectacle” to the viewing experience. This image is beautifully composed, with a clear vanishing point and a vector leading from the two firefighters in the front to the chimney in the background. The predominant color is blue. The smoke and the bare trees add an air of gloom to the entire scene. Although firefighters are present and taking action on the scene, this action can at best be labeled “reaction” and it is clear that whatever they can do is merely contain the disaster, not prevent it – a fitting analogy to our current relationship with catastrophic climate change on a global scale. The image shows the intertwined presence of man-made habitation and nature, and it is clear that what happened in this scene is not just the result of a house fire, since the scale allows the viewer to perceive the broad scale of destruction.



A river created from melting ice on the Greenland ice sheet, near where a team of scientists set up a research camp this summer.

Topped Desk Points to Race And Discipline

By CORAL DAVENPORT

A Close-Up Look at Greenland, Melting Away

ON THE GREENLAND ICE SHEET — The midnight sun still gleamed at 1 a.m. across the brilliant expanse of the Greenland

A Perilous Expedition Studies the Effects of Global Warming

the coming decades. The full melting of Greenland's ice sheet could increase sea levels by about 20 feet. "We scientists love to sit at our computers and use climate models to make these predictions"

Poll Indicates Deep Divide In the G.O.P.

Party Is Split on Issues From Taxes to Guns

By JONATHAN MARTIN and MEGAN THEE-BRENNAN

The latest New York Times-CBS News poll makes Republican Party divisions clear, from the choice of a presidential nominee to whether party members are willing to see their leaders compromise on legislation. For the first time since The Times and CBS News began testing candidate preferences in July, the retired neurosurgeon Ben Carson has displaced Donald J. Trump as the leader of the large Republican field, although the difference is well within the poll's margin of sampling error. The churn in the field suggests more volatility as the contest draws closer to the primaries early next year.

Mr. Carson and Mr. Trump draw support from different segments of the Republican electorate, with Mr. Carson winning the allegiance of evangelicals and self-described conservatives. Mr. Trump does better among Republican primary voters who do not have a college education and with those who are not evangelical.

The two wings of the party also differ on issues ranging from taxes and immigration to gun control and same-sex marriage. Republican voters appear remarkably aware of their own challenges: Three-quarters of those

ISIS CAPTIVES SAY THEY FACED BLADE AS RESCUE CAME

ACCOUNTS OF TORTURE

Execution Threats and Beatings Over Ties to G.I.s or Kurds

By MICHAEL R. GORDON

SALAHADDIN, Iraq — Muhammad Hassan Abdullah al-Jibouri had little hope that he would ever make it out of the Islamic State's jail alive, and he had not even seen the sun in more than a month. Then, early last Thursday morning, he heard the helicopters overhead.

The 35-year-old police officer heard bursts of gunfire, and shouts in Kurdish and in English. Suddenly, the door to his cell was battered open.

"Who is there? Who is there?" a soldier yelled, first in Kurdish and then in Arabic.

"We are prisoners!" Mr. Jibouri's cellmates yelled back.

Mr. Jibouri was one of 69 Arab prisoners of the Islamic State freed in a military raid near the northern Iraqi town of Hawija last week, the first in which American Special Operations forces were confirmed to have accompanied their Kurdish counterparts onto the battlefield.

On Tuesday, in their first interviews since being brought to the Kurdish autonomous region

Figure 3.8. The New York Times front page, Oct. 28, 2015. Photograph by Josh Haner for The New York Times.

This front page from *The New York Times* is discussed in Chapter 4. It is more than relevant here, however. As Chapter 4 reveals, the story about Greenland ice melting faster than expected was not intended to be placed on the front page, but it is precisely the availability of these apocalyptic sublime images that propelled it there, as per the photo editor's testimony. This image fulfills the criteria of an apocalyptic sublime image as defined above: the broad scale – so broad that the horizon exposes the curvature of the Earth, the aesthetic beauty – achieved through harmonious composition with the river cutting the photograph in two at one-third of its width, the lack of any human presence, the image depicts destruction – since that river of water is not supposed to be there, it is a fissure, a scar on the face of the ice. And finally, the image is clearly very distant from most readers' everyday experience. Interestingly,

Josh Haner's more recent work on climate change veers away from apocalyptic sublime imagery, focusing instead of the day to day plight of identifiable climate refugees in various locations across the world, including Alaska and Louisiana.



Figure 3.9. The Washington Post front page, August 3, 2015. Photo: AFP.

Here, the image of the firefighters walking towards the fire shows the scale of the danger: they are almost ant-sized. The image is clearly oriented from left to right, following the direction the firefighters are going along the road, with the vanishing point on the right side, cutting into the edge of the photograph at about 1/3 of the height. The viewer's gaze naturally follows the line created by the firefighters intrepidly heading towards the enormous blaze, which emphasizes the disproportionate size of the threat compared to the human response to it. In contrast to the previous photo, which is predominantly hued in blue tones, the tone of this one is predominantly warm, or red. The colors red and blue have been proven by implicit association testing (Ho et al., 2014) to create cross-modal associations with heat and cold respectively (as reinforced by faucet symbols or window thermometer

temperature indicators). Indeed, blue and red and their various hues can be considered as the staple colors of two main kinds of apocalyptic sublime images of climate change impacts: the blue dominating on photos of beautiful natural landscapes about to disappear as a result of our actions, and the red associated with the “warming” in “global warming.” Walsh (2015: 363) also refers to the famous hockey-stick graph of average temperature presented in Al Gore’s *An Inconvenient Truth* (2006) and its use of blue, connoting a safe zone, passing into red, which signals danger.

This last front page image, taken from the *Los Angeles Times*, is especially striking. Indeed, here we see a story on the low level of water in California’s drought-stricken reservoirs. Yet the choice was made to publish this particular image: in addition to showing the low level of water, it contains a breathtaking sky show of a thunderstorm, captured masterfully by the photographer. There are no humans included in the photo. It is not clear from the photo how the water level compares to the “normal” water level nor how the lack of water influences local populations. This photograph offers a combination of aesthetic pleasure derived from the photograph’s colors, striking features such as the lightning bolt, and composition, conspire with a sense of fear or even mourning for the water that is gone.

3.5. Discussion



LIGHTNING STRIKES as a rainbow arches over Lake Mead, which straddles Nevada and Arizona. The lake's water level has dropped almost 1,000 feet in just 17 years as the West has been plagued by drought.

EU left to scramble on Greece

Fears of a banking collapse, default and social unrest rise after an emphatic rejection of the bailout terms.

By HENRY CHIU

ATHENS — The resounding rejection of an international bailout deal by voters in Greece raised fears Sunday of the collapse of the country's banking system, a catastrophic government default, an eventual exit from the euro and potential social unrest.

In a surprising 61% to 39% result, Greeks said "no" in a

"Oxi! Oxi! Oxi!" — "No! No! No!" in Greek — rose in the balmy Mediterranean air.

But there were already signs of a backlash from angry European officials that could make any new bailout agreement even more difficult. If a deal is not struck quickly, Athens could find itself broke, forcing it to default on its debts and triggering a slide out of the Eurozone.

The left-wing government of Prime Minister Alexis Tsipras, which campaigned on a platform of opposing the bailout, won a surprise victory in a referendum Sunday.

[See Greece, A4]

Half empty, still half full

Obama

Figure 3.10. The Los Angeles Times front page, July 6, 2015. Photo by Allen J. Schaben / Los Angeles Times.

This theoretical discussion of the presence and meaning of apocalyptic sublime images of climate change in both art photography and photojournalism showed that the concepts and theories of broader visual culture analysis, including art criticism, can be useful in understanding the visual language deployed in media portrayals of climate change as well. The discussion constitutes an attempt to ascertain how and why images can distance, rather than engage, the viewer – a key part of this study. While the study of front page photographs which can be classified as “apocalyptic sublime” according to the criteria elaborated above is not meant to be representative, it does show that such images make it to the most prized spots in America’s leading newspapers.

One of the reasons for their presence in journalistic visual discourse of climate change lies within the aesthetically minded set of criteria that photo editors use when

selecting and offering photos for that prime spot. Zelizer (2012) points out that these criteria are surprisingly unclear: “Even today, some 150 years after the birth of photography and over 70 years after the arrival of wire-photo, there are still no definitive guidelines for how to select and use photographs in news” (Zelizer 2012: 57). *The New York Times* director of photography, Michele McNally, admitted in a Q&A with readers that the tension between selecting a photo based on its aesthetic appeal or based on its newsworthiness does occur (McNally, 2006). *The New York Times* Deputy Director of Photography Meaghan Loomer explicitly states that when she goes through hundreds of photos each day trying to narrow them down to just a few that will end up in publication, she considers aesthetics first. In an interview for the Times’ Lens Blog she affirmed: “at *The New York Times* our photographic operation aspires to a very elevated visual aesthetic — something that is going to feel unique and not the kind of visual storytelling that you can find just anywhere” (Estrin, 2015). Further elaborating on this approach, she notes: “You’re not simply in the right place at the right time proving that something happened. There’s a layer of visual language that you’re applying to your imagery, that might give it additional meaning” (Estrin, 2015). On the one hand, this additional “layer of visual language” is what has been discussed elsewhere in this thesis, the connotative layer of meaning making in a photograph, which makes it more than just an indexical “this was there then” statement of proof that something happened. On the other hand, the emphasis on aesthetic beauty in a photograph, on looking for “compelling,” “moving,” “breathtaking” images may skew the selection of news photographs towards the kinds more exclusively “spectacular” images, rather than those that tell a story, providing

vitality needed information that cannot be conveyed in words. Privileging spectacle in photography means distracting viewers from the meaning of the photo itself, and drawing them into its beauty, its timeless value as a potential work of art. At that point, the caption becomes unnecessary, and if there is one, it is quickly forgotten or reduced to its most basic form (Place, Year). As a result, apocalyptic sublime climate change images run the risk of doing what Susan Sontag warned about in her second book on photography, entitled *Regarding the Pain of Others*. She noted there that the aesthetic appeal of some war photos “drains attention from the sobering subject and turns it toward the medium itself, thereby compromising the picture’s status as a document. The photograph gives mixed signals. Stop this, it urges. But it also exclaims, What a spectacle!” (Sontag, 2003: 77). Swanson (2013) draws a distinction between aesthetics of communication and aesthetics of reimagining, positing that photojournalistic images employing the latter divert viewers’ attention from the content of the photograph and the importance of the news they pertain to, whereas the former enhances the viewers’ connection and emotional engagement with the content. Thus, there is a fundamental opposition, he claims, between two modes of presentation that photojournalism can embrace: “one approach clears the way for reality to come to us. The other claims to fetch us from the basement of our complacency but actually just takes us by the hand and leads us to a glass window so beautifully stained that we can no longer see out of it.” (Swanson, 2013). Further research, including extensive audience interaction with carefully coded apocalyptic sublime images, would be required to determine whether such photos of climate change fall into the “aesthetic of reimagining” category, as seems likely.

The conclusion of this chapter isn't a resounding condemnation or even skepticism toward "beautiful" images produced in an attempt to engage citizens with climate change. For example, Josh Haner in his latest combinations of drone photography and on the ground portraits articulates the use of beautiful images thus: "Using a drone definitely created a sort of visual eye candy (...) we thought it would be a good way to pique the reader's curiosity in order to scroll down and engage" (Estrin, 2016). Nor is this chapter a criticism of the porous boundaries between photojournalism and art. As Robert Hariman and John Louis Lucaites propose in *The Public Image* (2016), photography can be a public art that promotes a "civic" form of spectatorship, conducive to a more responsible, more imaginative society. In fact, they explicitly state that "photojournalists are doing what artists do: creating artworks that resonate with larger cultural patterns, reward dedicated seeing, and prompt insight into a common world" (Hariman & Lucaites, 2016: 99). They discuss an example – a photograph of an oil-drenched albatross after the Deepwater Horizon spill, to show how its raw realism combines with an eerie dignity in the bird's dignified posture and wide open eye: this, the authors argue, can cause viewers to want to avert the gaze, yet will also provoke an emotional reaction that "can do something too rarely achieved in public discussion of energy and environmental policies: fuse individual and collective responsibility." (Hariman & Lucaites, 2016: 87). Thus, it is not the condition of spectatorship itself that could be conducive to disengagement. Rather, it is the kind of spectatorship fostered by apocalyptic sublime images, which offer a simile of catharsis by combining aesthetic pleasure with

prescience of apocalypse, that could impede the potential of photography to heighten awareness and involvement with the pressing issue of climate change.

The next three chapters each offer a different facet of the continuous process that is visual framing, and thus help to understand the role of photographs in climate change engagement. Each one examines the question of photographic climate communication from a different angle: that of the gatekeepers (photo editors), that of social media users, and finally that of the interaction of potential news audiences with climate change stories. The apocalyptic sublime remains an important consideration throughout – in fact, one of the front page photos discussed in this chapter was cited by a photo editor in an interview and promoted by her as a model of good climate photojournalism.

4. Photo Editors: the gatekeepers of climate change visuals

4.1. Introduction

Content analysis of photographs relating to climate change in the news media has been carried out in multiple studies to date, as described in the preceding chapter. The most important recent contributions are detailed longitudinal studies of climate change visuals appearing in Canadian (DiFrancesco & Young, 2009), American (Rebich-Hespanha et al., 2015), Australian, British (Smith & Joffe, 2009; O'Neill et al., 2013; O'Neill, 2013) and German (Grittmann, 2014) newspapers. Fewer, but noteworthy studies have also been carried out on the audience side, with researchers using Q methodology¹⁹ and focus groups and experimental designs to assess which photos engage the public in the most productive ways (O'Neill and Day, 2009; O'Neill et al., 2013; Metag et al., 2016; Hart & Feldman, 2016). Whereas these studies have brought to light certain properties of climate change photos in Western media, they are mostly focused on the analysis and reception of a finished, static product. Sometimes, content analysis is longitudinal, as a way of surveying the evolution of a given frame (Schwalbe, 2006). This has been done by Doyle (2009) in her analysis of the evolution of Greenpeace's visual strategy in communicating about climate change.

¹⁹ Q-method is a form of factor analysis where instead of studying subjects to look for correlations between variables, variables are studied to look for correlations between subjects. It is an innovative mixed-methods approach first elaborated in the 1980s; it is useful in gauging the effect of verbal or visual discourses on respondents with different pre-existing attitudes and values. The main element of a Q-method study is the Q-sort, where participants (usually a small N – several dozen) are asked to sort a limited number of statements (visual or verbal) according to a specific instruction given by the researcher. Usually the Q-sort is followed by interviews or think-out-loud sessions with participants. For more on the Q-method see Watts & Stenner (2012).

Yet, this approach reflects a perception of framing as only the end product: the frame itself. In this dissertation, framing is considered as a process, and I focus on the actors driving that process. Specifically, I begin with photo editors in the newsroom, for they are both the ones who assign photographers to cover a story and the ones who filter through sometimes thousands of available images to depict a given event and choose which one will be presented to the public. For this reason, a first step towards understanding why the visual climate change frames are what they are is to understand the decision-making process and motivations of these actors. To date and to my knowledge, no such study based on interviews with photo editors has been done.

What follows is the result of interviews conducted with fourteen photo editors, three working for national media and eleven working for Californian newspapers of various circulation sizes. A first section will offer background and rationale for the choice of photo editors as interview subjects, and a second section detailing why the use of semi-structured interviews is appropriate in this context and for this research question will follow. A third section will describe the interview process and results thereof in detail. The complete interview guide is included in Appendix A.

Why photo editors?

As Schwalbe (2006: 269) mentioned, visual framing goes through many stages: from “the choice of events to cover,” to “the selection of what pictures to take, how to take them (angle, perspective, assumptions and biases, cropping, and so forth), and which ones to submit,” to “decisions about which images to publish, what size to make them, and where to position them on the page.” The fact that a photograph goes

through many stages of gatekeeping before reaching the page (print or web) is meaningful: as Schramm (1949: 175-177) suggested, the longer this succession of gates, the higher the probability of reality being altered. It can be argued that photo editors have a direct say in a majority of the gates a photo must go through in order to be published, from assigning a photographer to choosing a photo or series of photos. Conversely, they can influence how the story is illustrated by deciding not to assign anyone to cover it, or relying on agency photos instead. They also play a major role, in collaboration with layout and section editors, in determining the position on the page and the size of the photo. Thus the influence of photo editors is key in the process of visual framing, even if news editors and photographers also play decisive roles. In other words, it can be said that photo editors are visual “gatekeepers” in the newsroom (Fahmy, 2005: 150). Newton (2001:76) mentions picture editors as one of a newspaper’s six major gatekeepers, along with reporters, word editors, designers, marketing directors and publishers. She emphasizes that the process of “tending the gate” by picture editors “can begin long before the event itself, with an idea in an editor’s mind, picture assignment specifications, and the selection of the photographer for the shoot” (Newton 2001: 76). As the importance of visuals has grown, “the picture people are moving up the editorial ladder into positions of authority over more than pictures” (Newton 2001: 77). This is exemplified by the appointment of Michele McNally, Director of Photography at *The New York Times*, to the prestigious position of Assistant Managing Editor in July 2005. Bill Keller, Executive Editor, stated that “there had been some feeling over the years that photography at *The Times* was there

as an adjunct to the written word,²⁰ and added “the elevation of Michele to the masthead is (...) an overdue acknowledgment of the status photojournalism has earned at this paper.”²¹

However, research suggests that when making decisions about which photographs to use in a particular story, photo editors are motivated by principles that are difficult to clearly articulate. In a detailed study of one midsize newspaper in the Northeast, Bissell (2000: 88-89) showed that these decision-making patterns were hardly codified, and that even wire editors used rather subjective criteria when deciding which photos to publish, including personal political affiliation or sensitivity. She concludes: “Photographic gatekeepers at this newspaper made decisions based on political preferences, perceptions of audience expectations and personal opinion about explicitness” (Bissell, 2000: 90). An illustration of the elusive criteria at work in image selection by photo editors can be found in Michele McNally’s statements describing her job. In a Q&A with readers and aspiring photojournalists, she defined a “great photograph” simply as one that “makes you feel something.”²² In another live-streamed session of selecting 25 photographs out of 180, she stated that “the best kind of picture is historical in some way” and then that “it could be just beauty, too.”²³ Such variety and subjectivity in the criteria used by

²⁰ Atlas, Riva. „Times Names 2 New Assistant Managing Editors”, The New York Times, July 6, 2005.

²¹ Business Wire. “The New York Times Names Michele McNally and William E. Schmidt Assistant Managing Editors”, July 5, 2005.

²² New York Times. “Talk to the Newsroom: Assistant Managing Editor for Photography Michele McNally”, July 21, 2006.

²³ New York Times Lens Blog Live Podcast, May 5, 2016, <https://www.facebook.com/nytimesphoto/videos/vb.98934992430/10154189777592431/?type=2&theater> [Accessed July 15, 2016]

photo editors to determine what the public sees when consulting news about climate change can be unsettling, given the role images play in environmental communication. As Cox (2012:70) argues, “visual images often play pivotal roles in shaping perceptions of natural areas as well as our awareness of the impacts of pollution and toxic waste on human communities.” If images of climate change are to be taken as an important element of reporting on this issue, then it is worthwhile to better understand what goes into decisions about these images. Furthermore, in some cases photo editing decisions are not made by photo editors, but by individuals whose main job function is something else, like writing the story or formatting the page. Selection criteria in that case can be expected to be even less clearly thought through.

Semi-structured interviews in framing analysis

In the previous chapter, framing was defined as a “continuous, winnowing process”, following Schwalbe (2006: 269). In addition, as was mentioned above, previous research has found the reasoning behind which photos see the light of day to be idiosyncratic, or at best, subjective enough not to be easily articulated. Therefore, quantitative methods such as surveys do not seem appropriate, as the data gathered in this way could result in an overly neat classification of decision matrices having little to do with actual practice. Among qualitative methods, two seem fitting for the research question at hand: semi-structured interviews and shadowing. Both have been employed by Fishman (2001) in her dissertation examining the criteria for publishing pictures of death in print newspapers. Shadowing, a form of field observation, can be broadly understood as “a researcher closely following a member of an organization over an extended period of time”, usually in a non-participatory way (Macdonald,

2005:456). However, shadowing carries the risk of the researcher's presence altering the way a subject conducts his or herself in their everyday professional activities, because they know they are being observed – a risk known as the Hawthorne effect (Landsberger, 1958). In addition, shadowing requires a much more significant time commitment for the researcher, and cannot be done remotely (via Skype or phone), which makes it more cost-prohibitive than interviewing and limits the researcher to a small number of subjects. Interviews carry the risk of collecting data on what the subject says she/he does, thus remaining on the level of discourse rather than observing the actual practice (Klungseth, 2012). But semi-structured, in-depth interviews are “a dialogue between a researcher and a respondent with the intent to gain information (Berger, 2000). Semi-structured interviews provide the best form of qualitative data collection from professionals aside from shadowing. The use of semi-structured interviews as a data collection method for framing analysis is useful in this context, since it is precisely the initial stages of frame-building that are of interest.

Logistics

Face-to-face interviewing is considered the richest way of collecting interviewee input, since it allows the researcher to experience the interviewee's chosen environment, as well as observe their body language (Opdenakker, 2006). For budgetary reasons, and also to maximize the number of interviews across diverse locations, physical face-to-face interviews were not chosen for this study. The interviews were conducted via Skype, or via telephone where Skype was not available. Photo editors were approached through mutual contacts and snowballing was used as well. 8 out of the 14 persons interviewed held the title of “Director of

Photography” at their organization. The interviews, eight of which were conducted over the phone, one in person, and four on Skype with video, lasted 30-90 minutes. Invariably, the interviews with video chat lasted longer on average than the phone interviews. An interview guide (Appendix A) was produced beforehand, and consisted of a dozen or so open-ended questions. The interviewees filled out a brief online questionnaire before being interviewed. All the interviews were recorded for note-taking purposes. Because most interviewees did not wish for quotes to be attributed to them by name or by paper, the quotes reported here will be presented by “tier” (see Table 1) instead. In some cases, the person interviewed was the Director of Photography. In some cases, more than one photo editor was interviewed at the same newspaper. This information is not detailed in an effort to maintain the anonymity of the interviewees who requested it. The interviewees were mostly women (10/14), but for the purposes of preserving anonymity, the personal pronouns “he” and “she” will be used randomly in the discussion below. The Institutional Review Board found this study to be exempt from review insofar as there is no intervention that subjects responded to, and the interviews were related to their professional activity.²⁴

²⁴ University of Maryland Institutional Review Board letter received January 19, 2016.

Tier	Media Outlet Name	Daily Circulation (print)	Owner
1	The New York Times	1,379,806	The New York Times Company
	National Public Radio	26 million weekly listeners; 16.1 million monthly visitors online	NPR, Inc.
	The Washington Post	388,434	Nash Holdings LLC (Jeff Bezos)
2	Los Angeles Times	653,868	Tribune
	Bay Area News Group (San Jose Mercury News)	527,568	MediaNews Group
	San Francisco Chronicle	167,602	Hearst
3	Sacramento Bee	279,032	McClatchy
	San Diego Union Tribune	250,678	Tribune
	Orange County Register	250,724	Digital First Media
4	Modesto Bee	56,723	McClatchy
	Press Democrat	54,000	Sonoma Media Investments LLC

Table 4.1. Organizations at which participating photo editors were interviewed.

I focused on the case study of the California media market, so as to be able to present a complete universe of photo editor experiences in one specific media and environmental context. As explained in section 1.6, the decision to choose California was motivated by the assumption that if communication about climate change is developed anywhere, it should be this state – a state that has already faced consequences of climate change, lies at the heart of both significant causes (through agriculture) and inspiring solutions (the technology of renewable energy), and has political leadership willing to take action. The following news organizations were targeted for this interview stage: *Sacramento Bee*, *Modesto Bee*, *Press-Democrat*, *San Jose Mercury News*, *San Diego Union Tribune*, *San Francisco Chronicle*, and *Los Angeles Times*. In addition, *The New York Times*, *The Washington Post*, and NPR were also targeted, as general sources consulted nationwide. Table 1 shows basic facts about the newspapers approached and organizes them into tiers, according to their circulation numbers. The *San Francisco Chronicle* was included in Tier 2

despite its smaller daily print circulation because of its position among the top 20 newspapers in the nation, alongside the Bay Area News Group and the *Los Angeles Times*, when counting print and weekly online combined audience numbers²⁵. The primary reason for this division into tiers is to allow for a reporting of quotes without providing details on the paper or editor interviewed, so as to preserve their anonymity when it was requested.

One might object that visual media are distributed through vastly more channels than just newspapers. Recent survey research conducted in California (PPIC, 2014) has shown that newspapers, both in print and online, are declining – only 10 percent of respondents name newspapers (either online or in print) as their primary information source. However, it is safe to assume that even in a new and hybrid media landscape, these established news sources and purveyors of photographic coverage are a good indication of the kind of news Californians interact with. Furthermore, the photographic content produced by these papers is widely shared both with other papers and also redistributed across new media outlets online through syndication or friendly favors. According to the American Press Institute, “a majority of Americans also cite newspaper content in its various forms (66 percent)” as a source of news consulted on a regular, weekly basis (API 2014).

4.2. Results

The transcripts were subjected to an inductive thematic analysis, and the following themes were identified:

²⁵ Nielsen Scarborough Report, 2015 R2 (8/14-7/15) shows that in terms of nationwide combined online and print weekly audiences, the *Los Angeles Times* is first with 4,123,439 readers, Bay Area News Group follows eighth with 2,106,784 and the *San Francisco Chronicle* comes in fifteenth with 1,659,932 readers. The other publications in this study do not feature in the top 20 nationwide.

1. Regarding the general situation of photojournalism today, a tension was identified between dwindling resources (both money and time) and ever-rising demand for good visual content (especially for the web);
2. Most newspapers reported focusing their in-house photographic coverage on their local (100 mile radius) area, with remaining stories using wire photos;
3. Articles about aspects of climate change, such as drought, wildfires, and snow pack reduction or solutions, such as electric cars, carbon free housing, drought-friendly lawns, and water conservation were rarely placed in the wider context of climate change;
4. The availability of photos considered “high quality” often determines the placing of a climate change story in the newspaper;
5. The photos that resonate with readers the most are those that show a local, measurable, human impact.

A table summarizing the 14 interviews is presented. Each of the themes identified is expanded below, with supporting quotes provided for illustration and comparisons to findings in the literature. In addition, several of the interviewees agreed to provide examples of photographic coverage of climate change they were involved in editing, which they judge to be high quality. These examples are discussed.

Experienced serious staffing cuts in last 5-10 years	5/14
Expresses belief in a unique role for photography	3/14
Struggles with contradictory situation: ever higher demand for visuals combined with lower resources	5/14
Feels photography is highly regarded and valued	6/14
Notes that reporters, photographers lack time to get out and spot photo opportunities	4/14
Efforts of photo department are focused on depicting local community	3/14
Participates in Page One editorial meetings	8/14
Photo department pitches stories	6/14
Values photography as evidence of change	3/14
Climate change photographs overwhelmingly showing impacts rather than causes or solutions	3/14
Values the presence of humans in photos	3/14
Words describing a high quality photo	accurate, compelling, emotional impact, dramatic lighting, intimacy, an image that makes you smile

Table 4.2. Frequency of relevant statements among the 14 photo editors interviewed.

Tension among time, money, and quality

It does not come as a surprise to anyone studying the economy of the news media in the past twenty years that, especially in the case of newspapers, revenue is falling, to

the point that many are predicting the end of newspapers as we know them. In 2016, the Pew Research Center's annual State of the Media report found that "2015 was perhaps the worst year for newspapers since the Great Recession and its immediate aftermath." (Pew 2016). According to the American Association of Newspaper Editors, overall employment at newspapers declined from a high of 56,400 in 2001 to an all-time low of 32,900 in 2015.²⁶ In 2013, Pew reported that photographers, artists and videographers were the hardest hit by widespread job cuts and buyouts in the newspaper industry: a 43 percent decrease in jobs between 2000 and 2012, compared to a 32 percent decrease in reporter jobs and 27 percent decrease for layout editors and others (Pew 2013). The traditional advertising-supported model of newspaper revenue is not working anymore, and the online consumption of news is notoriously unable to recreate a model where users would be willing to pay for content (Goyanes, 2014). The interviews revealed more complexities and nuances in this situation, as well as concrete implications for photojournalism in its relationship to the verbal side of newspaper reporting.

A photo editor at a Tier 2 paper acknowledged that "newspapers are trying to find a way to support their staff on digital revenue rather than print. A lot of us made a mistake of giving our content away for free online, whereas we never gave it away for free in print. We've been more financially strapped, it affects not just the visuals team but the whole newsroom." Perhaps most importantly, the editors noted a tension between falling revenue, translating into staff cutbacks, and ever higher demand for visuals for the web. Some interviewees noted that because newspapers are

²⁶ American Society of Newspaper Editors, 2016 Newsroom Census, <http://asne.org/content.asp?contentid=129> [Accessed July 14, 2016]

traditionally run by “word” people, photographers are often first in line to be let go, even though their importance is higher than ever. A photography director from Tier 2 recalls: “In the end I had a photographer quit to grow pot so they could actually make enough money to live, and they replaced him with two columnists (...)” In addition, the ever-rising importance of digital presentation of the news online puts increasing pressure on reporters to publish several stories in a day, which means they tend to stay at their desks more, get out into the field less, thereby noticing fewer stories that they might otherwise pursue. In other words, as was emphasized by several interviewees, if a reporter does not “see” the characters or places in his or her story, they might not request visuals for it and the photo desk will not be involved at all or early enough in the process.

Similarly, in Tier 4 one photo editor described the tendency in her organization thus: “the theory is that if somebody leaves and there are cutbacks, we’ll just close a photographer position.” She further emphasized that “in my opinion photography has always been kind of given a back seat to the word people. In the company’s opinion and in the newspaper’s opinion, they’re the ones that they have to hold on to and value the most.” Most poignantly, she concludes: “I really feel like photojournalism has been strangled in order for the paper to be healthy in all the other areas. (...) We’ve let photo take a back seat, which in my opinion is not necessarily the smartest thing to do.”

Two photo editors, one from a Tier 2 paper and another from Tier 3, explicitly mentioned that photojournalism is still perceived as secondary in their newsrooms. The latter stated: “It does feel like photo is considered a service department to the

word side,” and added, “right now, our newsroom is very word driven, as many are. And that word culture, we’re trying to be more online centric and people are finally figuring out that you have to have visuals online.” However, most photo editors across all tiers felt that their department was highly regarded by the word editors and reporters; as a Tier 2 photo editor put it: “Photo is definitely equally important. Everything has to have visuals, so the visual people have to be at the table. If they’re not, then nobody’s going to be looking at your stories. (...) Not much gets started without photo or video being involved.” Paradoxically, while it appears that the growing importance of digital and its “hunger” for a large quantity of good visuals has improved the standing of photo departments, statistics (see above) show that photographers and photo editors are the first to suffer from cutbacks and ownership changes.

An editor at a Tier 4 paper, where photographer positions have been cut in the past decade, noted that because visuals are in ever higher demand, “our company has embraced this theory called ‘design thinking’ where anybody can be creative. So with all the cutbacks they’ve tried (...) to have reporters shoot pictures and video.” Unfortunately, as she points out, “you can have all these people running around with cameras, but it doesn’t necessarily mean you’re going to get good quality images from reporters and laymen who aren’t photojournalists.” The photo editor seemed to underscore a professionalism among photojournalists that might be lost if others are asked to take photographs. This is confirmed by research showing that amateur photojournalists do not have as developed a set of ethical principles as professionals do (Mortensen, 2014). Another study comparing the actions and rationale of

professional newspaper photojournalists and student photojournalists covering the same event (the shooting at the University of Texas at Austin on September 28, 2010) showed that professional photojournalists, “unlike the student (...) photojournalists, shaped their coverage based on learned routines, working to provide the public with meaningful images that accurately captured the event” (Yaschur, 2012: 176) and the student photojournalists had less expertise in the field in terms of communicating with one another as a team (Yaschur, 2012). Another Tier 4 photo editor interviewed echoed a similar sentiment, implying that professionals whose job it is to take photographs deliver higher quality visuals than reporters armed with cameras: “Reporters taking pictures is better than no photo, but...is it really information we need to communicate? I don’t know.” In other words, the concern articulated by this photo editor was that photographs taken by someone other than a professional photographer most often do not add any new information to the text of the story, but rather serve as a “token,” a form of proof that the reporter went to the scene. An example are student protests after the election of Donald J. Trump to the American presidency on November 8, 2016. The picture on the left (see Figure 1) was taken by a reporter writing the story, while the picture on the right was taken by a photojournalist. In this example, one thing is apparent: the reporter’s photo is taken from the back, so that no faces are visible. This lessens the potential emotional connection between the viewer and the subjects of the photo. On the right, whether thanks to skill, experience, or simply an abundance of time (since the photojournalist doesn’t have to also write the story), not only are the faces visible but the captured

moment is much more dynamic and tense. This kind of difference may have been what the photo editor referred to in this case.



Figure 4.1. Left: Students protest the choice of Myron Ebell to head the EPA. (Susan Svrluga/The Washington Post). Right: A group of students demonstrate outside the White House in opposition to President-Elect Donald Trump. Jose Luis Magana/AP

A Tier 2 photo editor was especially forceful in underlining the importance of visuals produced by professionals: “Let’s just be very clear here. There’s no debate about this. The visuals are the story. Period. The writing is ancillary to the visuals.” She added: “Legacy media does not seem to understand that writers can write all they want to but nobody will read their story unless there is a compelling image that will accompany it.” The *Washington Post*’s MaryAnne Golon said that her paper is a “writers” paper, where the words matter the most – but even she conceded that her department’s role is crucial since you must have good photography “to get people to read the story.” A photo editor from Tier 4, who’s seen photographers and editors being laid off and technology coupled with citizen journalism being espoused as a panacea for dwindling profits, expresses her skepticism: “I think that what we’re seeing here is that we have ownership changes and they buy into technology without understanding that there is a journalist behind the camera and that a person with a

camera is not a journalist or a photojournalist. There is a big difference between the person with a camera and a photojournalist.” She underlined her wish to have more staff photographers: “I would like to have a couple more photographers because they are different, they see stories in a different way that you’re not going to get from a reporter, who just wants to get the shot and move on to write their story. It’s really hard to do both.”

Interestingly, one photo editor said his Tier 2 newspaper’s photo department is not experiencing any cuts, and their organization was very conscious of the value of good visual journalism. He said:

“We’re pretty assertive on great visual storytelling and have not cut back on that with the downsizing of newspapers, so we’re kind of in a unique situation. We’re very engaged, we continue to do great photojournalism, (...), we’re aggressive, we come up with our own story ideas, we have not cut back at all. Our outlook is full steam ahead.”

Interestingly, another interviewee from a Tier 2 paper commented that this outlet was deluding itself, running their photo operations on money they did not have.

However, another photo editor, from a Tier 3 paper, also expressed the opinion that cutbacks were not an issue.

An editor from a Tier 2 paper revealed the tension between the speed of the web and the availability or opportunity for producing good photojournalism:

“There’s an acknowledgment that we live in such a visual time with the web that the importance of visuals has never been higher. (...) A lot of our reporters have to do several very short stories in the course of the day so they don’t have the luxury of time to go out and report stuff. That’s the speed that the web demands, moving on to the next topic so quickly.”

A photo editor in a smaller, Tier 4 paper noted similarly that “the reporting is done by phone or email. People don’t get out. That has decreased the quality of the

coverage.” An editor from Tier 3 says: “I’m not finding out about as many stories now, because our reporters are overwhelmed and they won’t talk to me. (...) I can’t keep track of it. I work the room constantly.” In other words, while traditionally the photo editor is in constant contact with all other sections of the newsroom, because of time constraints and ever-rising demand for online content to be published continuously, that communication is becoming more and more difficult. The same editor, commenting on in-depth photographic projects like independent photographer Matt Black’s documentation of poverty in the Central Valley, noted: “newspapers photographers are not afforded that kind of time.” This means that photo editor regrets not having the resources to send her own photographers out for long-term assignments that could produce detailed, rich story packages. Furthermore, she even expressed the belief that “because of our lack of resources, journalism is in danger at newspapers;” she expressed a wish for something like a team (photographer, reporter and videographer) who would be fully devoted to the climate change beat, and could follow it in-depth year round.

An editor from Tier 3 agreed about the mounting tension between the recognition of the importance of visuals (given “a lot of pressure to have good images” online) and the reduction in staffing. In addition, he noted that “as we have shrunk we have lost international reporting positions” that would have provided opportunity for more originality in the photographic coverage of climate change. A Tier 2 photo editor similarly affirmed that during her time at the paper, there was plenty of employment for photographers and photo editors, but it ended sometime in

2005-2008. Now, she notes, “The curves are exactly crossing: higher recognition of demand for visuals rubs against reduction in staffing.”

An editor in Tier 4 noted that layoffs in the photo department were ongoing. In 1988, there were 41 photographers at her paper but now there are only 14. She believes that digital has not necessarily ushered in an improvement in the quality of photojournalism. “You can create more images in less time, but (...) I think what folks are willing to publish in terms of quality of an image has, uh...changed, maybe not for the better always. We will go for an image that just does the job instead of a great one because of time constraints, or the need to get something to the web (...);” meanwhile, “the business side wants more photo galleries because that’s revenue.” On climate change specifically, this photo editor noted that “I would say the visuals aren’t where the words are on this story. (...) The diversity of coverage has gone down. Instead of having forty different views of how climate change has affected a glacier, you have two. So it becomes visual white noise after a while.” This comment is especially interesting since research (Manzo, 2010b) indicates that the image of a melting glacier itself has become, in many ways, visual white noise, a repetitive and stereotypical image of climate change that most viewers already expect to see and don’t learn anything new from.

Two cases mentioned by photo editors warrant a deeper discussion to illustrate the case that photojournalists cannot be replaced by reporters armed with “design thinking.” At the *San Francisco Chronicle*, former Director of Photography Judy Walgren reports how one of the most successful photographic accounts of the drought conditions in Fresno County was produced because a photographer, Leah

Millis, was on tour with the water district and drove past a shanty town of migrant workers, prompting her to return there of her own volition the following day to document the lives of people affected by water shortages with her camera. Despite a lack of resources, and having to camp most of the time she was documenting the shanty town, Ms. Walgren and Ms. Millis collaborated fruitfully to put together a stunning visual report, reminiscent of the 1930s dust bowl photographs by the Farm Security Administration photographer Dorothea Lange. Walgren recounts the effect these images had on readers: “by far, it was not as devastating as the Dust Bowl, but it certainly was shocking for people to see people living in the United States like that ... no running water, no toilets... bathing in irrigation ditches that were full of pesticides. So completely stripped of anything that we take for granted. This was quite shocking and very much a product of climate change.”²⁷ Upon being asked why she thinks these photos in particular represent effective visual climate change communication, Walgren explained:

“The images that Leah Millis produced over about a year of following a shanty town that sprang up at the height of the California drought perfectly illustrates how spending time on a story, feeling empathy or connection with the subjects and possessing a keen sense of visual literacy all work together to produce an intimate look at a situation that few would have entry into without this photojournalist’s dedication.”²⁸

²⁷ Interestingly, neither „climate change” nor „global warming” is mentioned even once in the story, available here: <http://www.sfchronicle.com/drought/article/In-drought-stricken-state-the-poor-suffer-most-6705990.php?t=63ef2264c2> [Accessed August 22, 2016]

²⁸ Judy Walgren, email to author, April 20, 2016

RUNNING DRY



The poorest displaced by drought

Shanties from page A22

By 2014, experts estimated that more than 17,000 farm jobs in California had been lost due to drought. Manuel Cunha, president of the Fresno-based Nisei Farmers League, said he has seen more fieldworkers out of work this year than ever before.

As farmers followed fields of vegetables and row crops, they told labor contractors to cut shifts from six or seven days a week in peak season to four or five. Then, Cunha said, they went down to two or three.

Work became so unreliable that some gave up and returned to Mexico. More than a million Mexicans and their families have left the U.S. since 2009, according to a study published last month by the Pew Research Center.

"Knowing these problems exist, the workers don't come back," Cunha said. "There's no jobs on the east side of the



Edgar Torres Castro paints the outside of his home as evening falls in the shantytown. Castro collects books from trash and likes to plant fruit trees around the encampment.

Photos by Leah Mills / The Chronicle

ably doesn't have a lot to eat or adequate housing and is going to have a very wet, cold winter."

For six months, Westlands Water District fought a legal case against the people living in the shanties. Most of the shanty residents, though, said they knew nothing about it — despite the notices issued in English and Spanish.

The district adhered strictly to eviction procedure, careful to close any loophole. A lawyer argued the district's case before a judge in Fresno County Superior Court. No one from the encampment attended the hearings.

In early November, a final warning was nailed to shanty doors: If you don't leave, it said, the Fresno County Sheriff's Office will forcibly remove you.

Then a fence went up — a chain-link perimeter sur-

times. An encampment of | tential to start the cycle again | ions and Mexican migrants in

Figure 4.2 Story on poverty in the Central Valley, published in 2015 by the San Francisco Chronicle, featuring photographs by Leah Millis.

In a similar case at *The Sacramento Bee*, a photojournalist went to Tulare County with a reporter, and decided to wander off from the official government business the reporter was writing about, to visit homes of people and see how they were coping with water shortages. She ended up staying the night in the town and producing breathtaking yet intimate photographs of a family using bottled water to wash themselves and cook. The photo editor involved, Sue Morrow, explained: "The photographs showing how people are functioning at home are the most telling (in my

opinion) because we can relate to them. They have far more emotion and tension than the pictures about the crops, which helps connect the viewer to the story.”



Figure 4.3. A photograph by Renee C. Byer featured on page A12 of the May 17, 2015 edition of The Sacramento Bee shows a woman bathing her one-year-old grandson in bottled water. Because of the photographs, the story also made it to the front page of that day's edition.

As mentioned above, Matt Black was held up as an example of a brilliant climate change photographer by one photo editor in a Tier 3 paper. He shoots the drought and the water shortages exasperating poverty in California's Central Valley. Yet unlike Ms. Millis' or Ms. Byer's photographs, his photographs are highly stylized, monochrome with a large grain, and eerily reminiscent of 1930s era images. The photo editor's argument for praising these photos was that because of their stark

styling, they stand out and “make you see.”²⁹ Black’s photos have appeared in *The New Yorker* and in *The New York Times*. In the latter publication, his photographs were described in similar terms to those used by curators speaking of the apocalyptic sublime images they present to the public (see Chapter 3): “featuring the beautiful photographs of Matt Black (...), [the video] lays out the plight of Central Valley farmers in black and white. The haunting images show barren stretches of dry dirt, gnarled and blackened trees seemingly raising their bare branches in desperate prayer to the cloudless sky, skinny sheep butting heads over shallow troughs of murky water.”³⁰ It is noteworthy to observe that one of the commenters on that video (which included a compilation of Matt Black’s photographs) said: “Beautiful video which romanticizes the realities it tries to reveal.”³¹ Another commenter states that the photographs were “made better” because they were “shot in black and white.” Other commenters use the words “amazing,” “arresting” and “fabulous” to describe the photographs – but a few commenters who know the area and the situation well offer criticism of the stark images: for example, on September 29, 2014 a reader from California, Brian C., commented:

The accompanying photo by Matt Black is arresting. And misleading. Even during really wet years, Central Valley farmers plow orchards under and burn the gathered remnants --- because the orchard exceeded its useful life, or economics justified switching to a different (more profitable) fruit/nut, or the farmer sold land to a subdivision developer. That photo could just as easily been taken in 1995, a huge rain year. The photo, like the story and referenced video, present a highly distorted picture to the reader.

²⁹ For an overview of these pictures with the photographer’s commentary, see <https://www.youtube.com/watch?v=6WGQ5rh1edI> [Accessed July 15, 2016]

³⁰ Flanagin, J. (2014). “California is Burning.”

³¹ Marks, M. (2014). Comment posted on September 30, 2014, to “California is Burning” (footnote 22).

In another comment he posted on the same day, in response to another commenter, Brian C. added: “I agree, Carl --- the photos (...) don't show the thousands of acres of new almond orchards recently planted in the Central Valley (that I drive by regularly). The Central Valley Ag/Water scene is too big and complex for a fluff story like this (...).”



Figure 4.4. Cover photo for The New York Times portfolio of Matt Black's photographs illustrating the drought in California's Central Valley.

Indeed, the photo chosen to represent Mr. Black's portfolio, showing “fallow fields near the town of Corcoran,” (Figure 4) does not convey visual information in any way except symbolic. If the photographs by Byer and Millis could have been called reminiscent of the Dust Bowl because they demonstrate that poverty has reached a similarly dire level as in those difficult years in the 1930s, the photo chosen among Black's photos to represent the story is reminiscent of the Dust Bowl for an altogether different reason: because of its aesthetic and symbolic value, its use of pictorial metonymy as the central device by which to convey the sense of desperation.

Photographic coverage of climate change: local symptoms only

Most newspapers reported focusing their quality photographic coverage on their local (100 mile radius) area, which included producing in-house photography for local stories. In stark contrast to the two national media outlets consulted as benchmarks, most Californian photo editors emphasized that their climate coverage is growing ever more local. This is tied to the staff reductions mentioned above, which make it difficult to afford sending a photographer far away (even within the state), since he or she cannot be spared for a long time. Thus, an editor from a Tier 4 paper noted that in order to send a reporter as far as Yosemite, which is less than 100 miles away, he has to make significant sacrifices. “It’s really unfortunate,” he explains, “we tend to stick closer to [our city] because it’s our most metropolitan area that we cover. A location like Yosemite will really have to be planned because I have to make sure I can spare [the only other photographer], since he will be there for the whole day.” The same editor emphasizes that only local stories related to climate change would tend to include in-house photography: “(...) we’re very local-driven. We do have wire content of course but we really try to make sure that the stories are very localized. On our section fronts it’s going to be a local story. (...) We may have a story on global climate change but it wouldn’t be as prominent unless something big happened.”

In a similar way, an editor from Tier 2 notes that climate is “a huge priority but we’ve made a greater priority of covering the climate within the state of California. We’ve shifted away over the last eight years from reporting on climate outside of California.” A Tier 4 editor emphasized that 9 out of 10 climate change related photos in his paper would be in house, rather than wire photos, because “we’re

covering our own climate change.” In other words, the focus in all tiers seems to be on the local manifestations of climate change rather than treating it as a global issue or international news story. This concentration on local news may be a result of careful strategic planning, but it may also be the result of economic calculation: not only is it cheaper to cover local stories rather than send a photographer and reporter to a distant location, but it is also more beneficial from a revenue standpoint. Indeed, one Tier 4 photo editor explains that since new ownership took over his paper, wire subscriptions have been significantly cut, because “their whole focus is, if we have a spot in the newspaper, I don’t want to see something from Baltimore, I want something from our community so we can sell an ad next to it. We can’t sell something from Baltimore. So the focus is local, local, local, local, to the point where everything in the paper as much as we can except the Nation page is going to be local.”

Thus, it appears from the statements made by photo editors at papers both big and small that coverage is becoming more and more local because of resource constraints, and at the same time that focus diverts framing away from the larger underlying issue of climate change and focuses instead of local symptoms of it, without always connecting the dots.

Climate change “symptoms” rarely related to the “disease” itself

Indeed, one tendency present throughout the sample of interviewees was the dissociation between local symptoms of climate change, such as drought, wildfires, reduction in snow pack, intensification of El Niño storms, and the term “climate change” itself as the underlying phenomenon. Many photo editors reported a

significant portion of their stories and photographs were directly related to climate change, but did not mention the term. This was particularly striking with drought coverage. One photo editor from a Tier 4 newspaper put it this way: “In California, everybody’s so concerned with the drought. With climate change, I always think about the arctic ice and the polar bears. And I see pictures from before, where there was so much Arctic ice, and now it’s really scary how diminished it is, but I think that sort of thing is so far removed from where I live (...).” This photo editor is admitting to the way that she visualizes climate change, as a distant, remote, overwhelming problem of global proportions, and shows that she reproduces this pattern in her editorial decisions by not tying in the local symptoms of climate change photographed by her staff to the underlying problem at hand. Another photo editor from Tier 4 spoke similarly: “You chip away at this thing: you say, drought, drought, drought and then you go: oh, climate change. So no, we’re not saying climate change, we’re not drawing that conclusion. Then in seven years we go: that was climate change.” Likewise, a photo editor from Tier 3 confirms this dissociation: “For a local drought, El Niño story, anything that we can get our hands on and cover locally, we often use local images for. But anything that is about global warming or climate change itself will almost always be wire and rarely has a photo.” Further, she noted, “If something has ‘climate change’ in the title or headline then it’s almost never a local story.” A photo editor at a Tier 2 paper said: “The drought is our major story. Climate change... to me it seems like a one hundred year look over time. I deal much more with what is happening right now.” Thus, it appears that photo editors

contribute to the episodic framing of climate change by not tying the locally taken photographs to the underlying issue.

As one director of photography from a Tier 2 paper explained, “climate change is the disease, and what we cover are the symptoms.” In one of the national media, a photo editor also stated that the stories published online with images are so hyperfocused and dealing with such granular level events, people, and places, that “climate change” as a whole is almost never mentioned. Surprisingly, a review of that entity’s reporting revealed this not to be the case, with “climate change” appearing in the headlines of at least a dozen stories within the past two months. However, it is true that in Californian newspapers, where coverage of the symptoms, such as drought, wildfires, intensified El Niño storms and snow pack reduction are abundant, the “disease” was not often mentioned.

None of the photo editors in California reported climate change as a whole being a priority for the paper’s news coverage. One editor noted that in the 1990s, the *Mercury News* was “on a mission” to report about the impact of technology on lifestyle. Now, the *Sacramento Bee* is similarly laying claim to being the top watchdog on the medical marijuana story. Similarly, a photo editor at the *Los Angeles Times* stressed that the drought is “their” story: “Drought (...) is one of our major beats, a keystone of our coverage for the state and for the country.” A photo editor from a Tier 3 paper said: “I have not heard anything like that about climate change. Drought and water to a certain extent, yes.” By “like that,” this photo editor means that climate change has not grown into a priority beat for the paper to cover, but continues to be covered by multiple desks under its various aspects (economy,

technology, environment, weather, policy). A notable exception is *The New York Times* which has put together a team specifically monitoring the climate change coverage offered by the paper.

A result of this is that many stories of climate change impacts and solutions, even though they feature in-house photography, do not mention climate change as the overall context or backdrop. In other words, news events that could be related to climate change are not, because their framing is usually episodic, rather than thematic. Iyengar's definitions can be of use here: "the episodic frame depicts public issues in terms of concrete instances or specific events (...). Visually, episodic reports make for "good pictures." The thematic news frame, by contrast, places public issues in some general or abstract context" (Iyengar 1992:42). Most noticeably, interviewees asked about "solutions" stories describe them as technology news rather than a response to climate change. A former Tier 2 photo editor confessed: "We covered the solutions but not because it was the right thing to do, but because we were the paper that covered Silicon Valley technology." At a notable point in the summer of 2015 when wildfires were ravaging California and President Obama's Clean Power Plan was discussed at the same time, front pages of national newspapers such as the *Washington Post* and the *Los Angeles Times* made no connection between the two despite publishing them side by side (Robbins, 2015). This tendency towards episodic coverage has been detected in climate change coverage before (Boykoff and Boykoff, 2007). Episodic framing of climate change here means not only reporting on every climate-related incident as an isolated event rather than part of a slowly accumulating crisis, but also implies segmenting the climate story into discrete reports that are not

shown to belong to the same context. Hart (2011: 46) concluded that episodic framing of climate change news “may cause the viewing public to (...) have less support for government policies that address climate change,” which was confirmed by Sol Hart & Feldman (2016). Considering the economic pressures on photojournalists and photo editors alike, mentioned above, it is unsurprising that episodic framing takes the upper hand in climate change stories, since editors can rarely afford to send a photographer out to cover a developing story in depth over several weeks or months. As an example, the following quote from a Tier 4 photo editor shows how short staffing leads to more time pressure being put on each photojournalist to deliver the necessary photographs as fast as possible. She reminisces about better times, before the mid 2000s, when the paper had 10 people working in the photo department (now it has only one photo editor and one photographer):

“because we’re so short in photo, in the past it used to be, you would come to work, and if you just had one thing to shoot the rest of the day was kind of yours, you could go out and drive around and find things and enterprise things, and you could also pitch ideas for stories that may run later in the week...”

The disconnect between stories intrinsically related to climate change and the apparent lack of a contextualization with that issue is apparent in a *Los Angeles Times* story about the low level of water in Lake Mead. Striking photographs of the lake by a *Los Angeles Times* staff photographer featured on the front page of the July 6, 2015 edition (see Figure 3.10 in previous chapter), yet nowhere in the story is climate change mentioned as an intensifier of the drought. Although the link between rising temperatures, earlier snowmelt, and lower levels of water in reservoirs causing hydrological drought is well documented (Sheffield & Wood, 2008), and the

American Southwest is especially vulnerable to this impact, this story and many others like it do not make the connection. In addition, this photograph is a classic example of apocalyptic sublime in climate change imagery: its beauty and scale seem to draw away from the subject at hand and towards appreciation of the image's aesthetic quality.

A Tier 2 photo editor, asked about the reason for the lack of climate change context in climate change stories, noted that

sometimes we don't mention climate change as a background/underlying issue because people have a sensitivity to it. There are certain phrases that when you use them in journalism people react differently to your articles. I would say that all our articles that address climate change issues don't necessarily have the phrase climate change in them. If you use things that people hear over and over you're risking people not reading your article or reading it in a different light.

Perhaps it is understandable that news professionals choose not to contextualize all climate-related stories within the broader theme of climate change. They may wish to avoid hasty associations without providing enough scientific evidence. They strive to engage all their readers, even those who may otherwise be dismissive or uninterested in a story about climate change. This instinct is understandable, insofar as climate change in the United States has become a hot-button partisan issue (Zhou 2016). Hart & Nisbet (2012:702) found in a study of 240 adults that motivated reasoning played a large role in how people interpret climate change related information: "individuals are more likely to pay attention to and interpret information in ways that reinforce their political views".

Yet, the result is that explicitly labeled climate change images and stories are overwhelmingly catastrophic, though sometimes hauntingly beautiful (as in the Lake

Mead photo) impacts of climate change. This in turn tends to disaffect audiences by reducing their sense of self-efficacy and leading to a perception of inevitable doom (O'Neill and Day (Nicholson-Cole), 2009; Manzo 2010; O'Neill et al., 2013).

Leviston et al. (2014) found in their experimental study of climate change images that many participants initially did not even consider “solution” images such as those showing windmills as belonging to the “climate change” topic, because “climate change is not, for the most part, associated with positive outcomes” (Leviston et al., 2014:453).

Photography's role in the agenda-setting of climate change

Based on a study of 1000 image-heavy news stories in the *Sydney Morning Herald*, Caple (2013) found that aesthetic appeal (defined by high compositional quality) of photographs could “be considered as a factor in the newsworthiness” of news stories. One of the most interesting findings that emerged from the interviews conducted here is related: it appears that photography, beyond simply acting as an “anchor” for readers to engage with a story, and apart from adding visual information to the word-driven reportage, acts as a moderator potentially influencing how high on the agenda a given story will be. In other words, the availability of high quality, engaging photographs may lead to placing the story in a prime position, even in cases where the story's topic on its own may not have warranted such placement. A former Tier 2 editor confirmed this in her testimony:

The visuals team (photo editors and page designers) had strong influence over where stories were placed. Each day, every section front demanded a visual “centerpiece” treatment, which relied on a strong photograph, chart or data visualization or an illustration. The visuals played a

weighty role in how the stories were placed together on the page and how well they were displayed on Page 1 and other section covers.

Similarly, in Tier 4, a photo editor stressed: “every single section front is, we don’t care what the other stories are, what’s that centerpiece photograph and story going to be, then we’ll fill the holes around it. So photography comes first here.”

At the national level, Meaghan Loram of *The New York Times* noted that although photography at her publication tends to go hand in hand with verbal journalism, there are “cases where the story was intended to be sort of modest but the visuals that we gathered were so powerful” that the story itself became much bigger. She offered one description of how a story gained more prominence than it was initially afforded, after the photographer came back from the field: “When Josh Haner came back and had these stunning stills from a place that is rarely seen and so remote, that launched the story into a bigger profile item.”³²

³² „Greenland is melting away”, interactive package, The New York Times, October 27, 2015. <http://www.nytimes.com/interactive/2015/10/27/world/greenland-is-melting-away.html> [Accessed June 13, 2016]

"All the News
That's Fit to Print"

The New York Times

Late Edition

Today, cloudy, windy, rain, localized flooding, high 86. Tonight, windy, rain, localized flooding, low 84. Tomorrow, some sun, breezy, high 73. Weather map appears on Page F8.

VOL. CLXV . . . No. 57,033

© 2015 The New York Times

NEW YORK, WEDNESDAY, OCTOBER 28, 2015

\$2.50



A river created from melting ice on the Greenland ice sheet, near where a team of scientists set up a research camp this summer.

Toppled Desk Points to Race And Discipline

A Close-Up Look at Greenland, Melting Away

By CORAL DAVENPORT

A Perilous Expedition

the coming decades. The full melting of Greenland's ice sheet could increase sea levels by

Poll Indicates Deep Divide In the G.O.P.

Party Is Split on Issues
From Taxes to Guns

By JONATHAN MARTIN
and MEGAN THREE-BRENAN

The latest New York Times-CBS News poll makes Republican Party divisions clear, from the choice of a presidential nominee to whether party members are willing to see their leaders compromise on legislation.

For the first time since The Times and CBS News began testing candidate preferences in July, the retired neurosurgeon Ben Carson has displaced Donald J. Trump as the leader of the large Republican field, although the difference is well within the poll's margin of sampling error. The churn in the field suggests more volatility as the contest draws closer to the primaries early next year.

Mr. Carson and Mr. Trump draw support from different segments of the Republican electorate, with Mr. Carson winning the allegiance of evangelicals and self-described conservatives. Mr. Trump does better among Republican primary voters who do not have a college education and with those who are not evangelical.

The two wings of the party also differ on issues ranging from taxes and immigration to gun control and same-sex marriage. The

ISIS CAPTIVES SAY THEY FACED BLADE AS RESCUE CAME

ACCOUNTS OF TORTURE

Execution Threats and
Beatings Over Ties to
G.I.s or Kurds

By MICHAEL R. GORDON

SALAHADDIN, Iraq — Muhammad Hassan Abdullah al-Jibouri had little hope that he would ever make it out of the Islamic State's jail alive, and he had not even seen the sun in more than a month. Then, early last Thursday morning, he heard the helicopters overhead.

The 35-year-old police officer heard bursts of gunfire, and shouts in Kurdish and in English. Suddenly, the door to his cell was battered open.

"Who is there? Who is there?" a soldier yelled, first in Kurdish and then in Arabic.

"We are prisoners!" Mr. Jibouri's cellmates yelled back.

Mr. Jibouri was one of 69 Arab prisoners of the Islamic State freed in a military raid near the northern Iraqi town of Hawija last week, the first in which American Special Operations forces were confirmed to have accompanied their Kurdish counterparts into the battlefield.

Figure 4.6. In this example, a climate change photograph occupied the most prominent position of all (page one, above the fold), because the photography turned out to be more compelling than expected. Photo by Josh Haner. Caption: "A river created from melting ice on the Greenland ice sheet, near where a team of scientists set up a research camp this summer." *The New York Times*, A1, October 28, 2015.

When asked what determines whether a story with visuals will make it to the front page of *The New York Times*, she explained that a photograph will be on the front either because of how important the story is, or because "the visuals were so strong for that story that even though the story isn't on the front," the photo is. In the latter case, even if there is only a headline and photo, without the story itself, the presence on Page One itself significantly boosts the story's perceived newsworthiness and increases its visibility to readers. An editor from a Tier 2 paper in California emphasized that the more climate change is visible, the more good photography can be produced relating to it, which means it will gain more prominence in the paper: "What drives our coverage so much has been the visuals: you can see it and you can feel it. It's hot all the time in ways that it never used to be. And there's no snow on

the mountains. That's what drives a lot of it. (...) So there's real stuff that is interesting to report on and that's what drives the coverage." MaryAnne Golon, Director of Photography at the *Washington Post*, did not confirm the existence of such a spontaneous agenda-setting effect of photography – at her newspaper, which engages in considerably less in-house photojournalism than *The New York Times* does, Page-One worthy visuals are planned and assigned in advance.

A photo editor from a Tier 4 paper confirmed that in her daily meetings, she can have more influence over whether a story will be prominently featured on a section front based on the quality of available visuals: "I do have a lot of influence over where a story will appear, based on how good the photography can be." Similarly, a photo editor from Tier 3 claims that "it's extremely important to have a picture or a graphic if you want people to notice the story." One paper goes even further, by publishing "image-nuclear" (Caple, 2013) news stories, i.e. a regular captioned photo in the A section that runs without a story. The photo editor for that paper, which was a rare instance of an organization not suffering cutbacks in its photo department, emphasized that "all the time, every week, story ideas come from the photo department. Our photographers often pitch ideas, because they are out in the field and they come across things." In the 2006 Q&A session with Michele McNally cited above, she also mentioned that "we encourage our photographers to initiate stories." Even in Tier 4, despite two thirds of his photo staff being let go over the last seven years, a photo editor boasted:

Part of being a photographer here is that you create enterprise. It is your job to go out and find a story, shoot it and get a reporter attached to it. If you pitch me a story, I'll probably approve it, but basically the way we work is I'm not going to hand it to you on a

silver platter, you go find it in the community and tell me why it's important and then we'll go after it. It goes in cycles. One person will be off staff doing it, while everybody else picks up their work and it will be a rotation, as much as we can.

People are moved by people, local impacts, and photographic evidence of change

While photo editors seemed to use similar criteria in selecting news photographs for publication in print and online, it was difficult to determine whether any specific criteria could be applied to climate change photos. Although most editors put forward elements such as good composition, lighting, the ability to articulate a situation well in one rich frame, there were also some unexpected comments, like one from a photo editor in Tier 4 who said: “We strive to have images that will make you smile.” When asked what pictures resonated the most with their readers, photo editors emphasized several elements of a photo that would make it more engaging. The two most important aspects were the presence of humans at the center of an image, and the ability to see evidence of concrete change by looking at the image. Moreover, some photo editors expressed the belief that local photos have a higher impact on readers than distant pictures showing experiences unrelated to their everyday lives.

Presence of humans

At the national level, *The New York Times* Deputy Director of Photography Meaghan Loram stressed that with the climate change story, which is inherently so difficult to capture in a photograph, the fact that it has had more and more visible impacts on people's lives make for better, more engaging photography. She observes: “Until now we didn't have many human stories. That's why the climate refugees story is great,

otherwise it was hard to illustrate many climate change related issues, as they haven't happened yet..." In her view, readers tend to be more engaged with a story when there's "a person in the middle," which is reflected in page views. She believes that the same goes for photographs. At *The Washington Post*, similarly, MaryAnne Golon explained that

If you see a raked landscape even in a place you don't know, you cry a little bit for it but it's more impactful if there's a bunch of workers standing in the same landscape. We try to look wherever we can to reveal the human part of the story. It's harder but it's most of the time doable.

A former Tier 2 editor from California emphasized the importance of "emotion" and "intimacy" in photographs. She especially emphasized the need to "humanize" people who were dealing with the consequences of climate change, because in her view, "most people who are affected by climate change are 'othered' by the white people who have the power and are able to pay for controlling their environment." Another photo editor from the same paper explained: "Something that we really reach for is to find a face for the story. We tell the reporters: we want someone, a face, a person whose life this relates to. In that way we avoid the reservoir photo or the cracked ground photo. We find someone who can give us a deeper understanding of the problem."

This finding is consistent with Smith and Joffe's (2009) analysis of climate change visuals in British newspapers. They found that one of three themes was "personification" of climate change through the depiction of climate change victims as well as celebrities and politicians discussing the phenomenon. According to Smith and Joffe (2009: 659), "journalists actively seek out stories in which a human interest

factor can bring the content alive.” Research also indicates that people will care more about victims of climate change when these can be seen and named, rather than just enumerated in a text. This tendency is harnessed by charity organizations in their public appeals for donations (Small & Verrochi, 2009; Campbell, 2011). The associated effect, called the “identified victim effect” (Small & Loewenstein, 2003: 6; Slovic, 2007) rests on the social psychology concept that “people become more mentally and emotionally engaged when they process information about specific individuals than when they process information about abstract targets” (Small & Loewenstein, 2003: 6). In the case of victims, it translates to the fact that “individuals tend to have stronger affective responses toward an identified individual and express a greater willingness to help an identified individual compared with an unidentified individual.” (Hart 2011: 32). Manzo (2010b: 198, 202) uses the identified victim effect to explain the prevalence of the “lone face” of climate change victims often portrayed in photographs – be it human victims of extreme weather events or lone polar bears stranded on ice floes.

Local, relatable setting

As mentioned above, newspaper photo editors cite economic reasons, including ownership changes and severe staff cutbacks in most cases, when describing the ever more local focus embraced by their publications. Yet, this may help readers engage with the climate change story, since research has shown that it is precisely the local impacts presented through photographs that are the most effective in communicating climate change risk (Scannell & Gifford, 2013). Thus, while *The New York Times* can

afford to pursue international stories, and proudly does so, the deputy photo editor wondered whether citizens in the United States would be more connected to stories that were more local, rather than distant such as a story on climate refugees in Bolivia. She observes: “The impulse to go to those places makes sense because the impact there is so much more obvious, but it’s more challenging to find the local stories. On the one hand we are very fortunate to be able to cast such a wide net, but on the other hand we also need to make sure we’re looking at the foreground, not just the distant horizon.” An editor in Tier 3 confirmed that in her view, only local photos could affect people, and only if they “read far enough” into the photos. The other kind of photographs, most often provided for her paper by press agencies, tend to be of the “visually stunning” sort, which more often than not serves merely as “eye candy” and, she adds, “there is not necessarily a lot of reportage in those.”

Visual evidence of change

An editor from a Tier 2 paper in California agreed that “photos are more compelling when there are people in them,” but didn’t want to generalize, as sometimes pictures showing before and after levels of snow or water in a reservoir could be, in his view, just as effective. He mentioned in particular the ability, online, to provide readers with “interactive” before and after photographs with the use of a slider, toggled by the reader/user, allowing one to see the “before” transforming into the “after” at a self-set pace. Similarly, a photo editor at *The Modesto Bee* recounted how a historical bridge that had been covered by the waters of a reservoir recently reappeared because of water levels dropping, and how the sight of that bridge served as both unexpected and

eye-catching visual evidence of the drought. In Tier 2, an editor said that “change photos resonate with people, photos that illustrate some kind of change in the environment or people’s lives.” Finally, another photo editor in Tier 4 repeatedly emphasized the value of photography, as compared to other visual media, in serving as evidence of climate change:

“One of the biggest most crowd-pleasing and powerful things that we’ve done is the before and after shooting of a full reservoir and then empty reservoir, (...) I think those are very powerful images that you can’t get from a graphic or a cartoon because it’s real, a person stood right there and shot this and it looked just like this on this date. It’s a legend, it’s historical, it’s something that has been imprinted that can’t be overwritten because it’s been photographed.”

Nonetheless, as Doyle found when analyzing the visual climate change communication produced by Greenpeace since the late 1990s, a potential drawback when focusing on “then-now” photos showing undeniable climate change impacts over time is that they fix climate change in the audience’s mind as belonging to the past, a phenomenon already having provoked irreparable damage. She notes:

“photographs of retreating glaciers depict an already affected environment, illustrating the current reality of climate change through the image, and at the same time signifying the failure of preventative action required to halt its acceleration.”

(Doyle 2009:280).

Finally, it must be noted that the public is sometimes moved by the most unpredictable images from a professional point of view; images that would usually not pass the scrutiny of demanding photo editors and would not attract any Pulitzer prizes. One Tier 3 editor mentioned readers are interested in seeing things they would not otherwise know about, “things that are unusual,” like strange creatures washing

up on the shores of Californian beaches. Thus, there have been many stories featured in that paper with photographs of such marine fauna as does not usually appear in the local latitude, as a result of the unusually warm waters. An editor at the *Los Angeles Times*, for example, expressed his astonishment that what he called a “boring” photo of governor Jerry Brown making a speech in a field that is normally covered in ten feet of snow caused an “uproar” among readers (Figure 7). Similarly, in a Tier 4 paper, photographs of yard signs reading “Pray for Rain” (and later, in the rainy winter, “Thanks for Rain”, see Figure 8) became very popular with readers, despite the fact that photos of yard signs do not usually fit the standard of an engaging, high quality photo, and would certainly not win any photojournalism awards.



Figure 4.7. April 1, 2015. Gov. Jerry Brown talks to reporters in Echo Summit, Calif., about his new executive order mandating cities and towns to cut water usage by 25 percent. (Rich Pedroncelli / Associated Press)



Figure 4.8. A Thanks for Rain sign is pictured near a Pray for Rain sign on Tuesday, Jan. 2, 2016, on Merle Avenue in Modesto. Joan Barnett Lee/ Modesto Bee

4.3. Conclusion

This historical moment matters in climate change visual storytelling because the story is becoming visually more interesting (since people locally are becoming affected) and because it appears that photojournalism can act as a catalyst in agenda setting for the climate change story, which struggles to make front page news. The wealth of information garnered from the interviews, though by no means representative of all professional practices in Californian photo desks, warrants an examination of the “missing frames”: visuals that do not exist (Rebich-Hespanha et al., 2015: 511).

First, though many photo editors reported having published “solutions” stories with original, in house photography, these stories were very rarely framed in the context of climate change. In addition, several photo editors emphasized that

solutions images were not nearly as compelling as impacts. For example, a Tier 2 photo editor mused: “[climate change reporting] was much more visually driven by the consequences. We’re talking about a Pulitzer: are you going to remember the woman running naked in Vietnam or the person who installed solar panels on their roof?” This confirms what O’Neill (2013) found in her content analysis of 1,603 images from British, American and Australian newspapers: they “rarely included images of mitigation and (...) none of the newspapers studied included images of renewable energy sources.” Yet, as Witte’s (1992) extended parallel processing model for risk communication posits, it is essential when communicating a threat to include information about what individuals can personally do to counter that threat. Otherwise, if the public is merely scared, without being shown any ways to increase their self-efficacy or response efficacy, they will retreat into “fear control”, trying to ignore or minimize the threat without doing anything to reduce it. Drawing on O’Neill & Day’s (2009) finding that images of impacts promote salience to the detriment of self-efficacy while images of solutions do the opposite, Hart & Feldman (2014: 328) conclude: “effective climate change communication, including news coverage, should include discussion of both impacts and actions, to achieve the balance of perceived threat and efficacy needed to promote public engagement.”

Secondly, no photo editor interviewed mentioned any stories including photographs of specific industrial or political actors who are at fault for preventing mitigation or who are engaged, through lobbying or disinformation, in the continuation of “business as usual.”

Similarly, most photos mentioned by the interviewees when depicting the man-made contributors to climate change are “at scale” – that is, pictures of traffic or smoke stacks, but not pictures of individuals engaging in activities like a leisurely car trip or meat consumption. This echoes the finding made by Rebich-Hespanha et al., (2015: 513), whereby “most of the images focus on human activity that (...) is represented in a way that depersonalizes the activity or distances it from personal everyday experience.”

In the Climate Visuals report produced by Climate Outreach in the UK, Corner et al. (2016) explicitly recommend shying away from such private-sphere photos:

We found that people do not necessarily understand the links between climate change and their daily lives. Individual ‘causes’ of climate change (such as meat-eating) may not be recognized as such, and if they are, may provoke defensive reactions. If communicating the links between ‘problematic’ behaviors and climate change, it is best to show these behaviors at scale – e.g. a congested highway, rather than a single driver.

The interview data indicates that photo editors do not even mention the use of individual-scale images to present climate change causes. The only case where someone mentioned these kinds of images was the “shaming” of people who water their lawn in the middle of the day (Tier 4) and this was mostly generated from social media and considered anecdotal. When prompted, one photo editor from Tier 4 even countered: “We’re not here to point fingers; we’re saying: here’s what’s happening to Mary Jo Stanley and her family. Everyone can draw their conclusions from there.” Overwhelmingly, photo editors stress that they strive to provide images of palpable local impacts centered around a “face”, a family, a community. Thus, climate change

is almost exclusively portrayed photographically as a calamity ruining people's livelihoods; they are not actors, but victims of it. Rebich-Hespanha et al. (2015), however, recommend portraying the individual's role in causing climate change: "journalists seeking to provide actionable information to the public should focus more attention on the private sphere" (Rebich-Hespanha et al., 2015: 513). This seems to be a worthy matter of further investigation: are individual-scale images only engaging when the individual in question is a climate change victim, rather than, as most of us are on a daily basis, a climate change contributor?

This chapter has attempted to elucidate why photo editors choose certain visual frames of climate change over others. While they are not isolated actors in story production – far from it – they do wield significant influence over the choice of imagery in climate change stories. From the responses gathered in the interviews, it appears that photo editors react to what they believe matters most to their readership, and cover climate change accordingly. This results in many stories about impacts lacking the reference frame to climate change, among other things because some photo editors fear that this frame is alienating to readers. It also leads to almost no solution photos being published within climate-change related stories: on the one hand, they are not as visually interesting, which echoes the general newsroom mantra that "if it bleeds, it ledes", and on the other, if these photos appear, they do so separately, in stories related to technology, science, or business. There is also no significant effort to provide engaging visuals of climate change causes or contributors, since photo editors wish to avoid "pointing fingers", instead documenting what is happening in the community. In addition, the narrow visual

framing of climate change is enhanced by the fact that explicitly labeled climate change stories tend to be those coming from a national or international stage and adorned with stereotypical or mundane agency photos (a drop of water dripping from an iceberg, indistinct smokestacks, or a politician speaking at a podium).

An important reservation must be made at this point: although the interviews with photo editors convey rich information about how they operate, what they are seeking to communicate using photographs, and what pressures and challenges they face, many of the photos published by newspapers, especially online, are not even selected by a person whose job title is “photo editor.” Even at Tier 1, between two nationally important papers such as *The Washington Post* and *The New York Times*, there is a significant difference in staffing: MaryAnne Golon pointed out that whereas *The Times* has about 50 photo editors, *The Post* has only 12 for a newsroom of 700. As a result, “half the time if you were looking at all the digital content produced about climate change, the selection of the photographs would’ve been made by the writer writing the story or the assignment editor, not the photography editor.” She added that where the *Times* has a team of photo editors working on illustrating a set of stories, the *Post* has at most one person. If this is the case at *The Washington Post*, it is certainly the case in smaller papers as well. Thus, a limitation of this chapter is the fact that only people whose job title includes the term picture/photo editor were interviewed.

Another important limitation inherent in asking photo editors questions about climate change is that some images, which might fall in this category, might not come to the subject’s mind. This happens despite the precaution taken to define “climate

change photographs” at the outset of every interview as those images pertaining to climate change causes, as well as solutions, not only negative impacts (see Appendix A). As an example of this, when browsing the NPR website one can find many diverse photographs, some taken by NPR photographer David Gilkey[†], included in stories containing “climate change” in the title, yet the photo editor interviewed for this thesis inferred that no such photography was made by the news organization, insisting that “we don’t do a lot of visual coverage of climate change (...) we very rarely make the connection between actual climate change and some environmental issue. (...) Usually our stories are about a very specific place and situation.” In fact, the NPR website features multiple explicitly labeled climate change stories with Gilkey’s photographs, such as a story about the influence of climate change on relationships between humans and tigers in a region in India,³³ or an elaborate five-part series full of Gilkey’s photographs on the intensification of wildfires due to climate change in the American Southwest.³⁴ What this case shows is that even after climate change photographs are published, photo editors may not perceive them as belonging in a wider context of “climate change coverage”.

Climate change is inherently visually elusive and requires the use of innovative visual storytelling, which in turn means devoting significant resources, in terms of professional photographers able to spend a significant amount of time working on a story, as Leah Millis did for the *San Francisco Chronicle* (See Figure

³³ Shapiro, A. “In India’s Sundarbans, People And Tigers Try To Coexist In A Shrinking Space”, May 20, 2016, available at <http://www.npr.org/sections/parallels/2016/05/20/478387211/in-indias-sundarbans-people-and-tigers-try-to-coexist-in-a-shrinking-space> [Accessed March 17, 2017]

³⁴ Special Series: “megafires: the new normal in the southwest”, available at: <http://www.npr.org/series/158936457/megafires-the-new-normal-in-the-southwest> [Accessed March 16, 2017]

4.2). A discursive phenomenon occurs on the level of regional newspapers preventing some stories with high quality, original photography to be categorized as “climate change” stories, even though they inform the public about impacts, causes, or solutions of climate change. This is especially the case with cause and solution stories, which are rarely related to climate change, solidifying the notion that climate change is negative. Indeed, most photo editors in California reported using “wire” images (mostly from AP) on explicitly “climate change” stories. There is no lack of engaging photography even at those papers struggling the most with resources and staffing, but that photography might not make it into the public’s perception as being related to climate change. The result is a narrow visual framing of climate change, limited to the most stereotypical images of causes (smoke stacks and cars stuck in traffic), impacts (glaciers melting, cracked earth), and solutions (heads of state negotiating). When questioned, photo editors themselves associate almost only the impacts with climate change, perpetuating the idea of it being a mostly negative story. This too hampers engagement with climate change that could go beyond “alarm” and towards action. Nonetheless, newspapers are also beginning to engage in long-term, in-depth photo reportage that shows there may be a way forward: most notable is the series on the plight of climate refugees, with photographs by Josh Haner. It is no coincidence that this thoughtful, rich, and engaging series has appeared at a paper that in decided to bring together a working group of editors and reporters working on climate change coverage, as explained by Looram. Later, in February 2017, the working group morphed into a desk of its own: it “exists as its own desk in the newsroom (just like, say, the national desk or the sports desk) and consists of editors

and reporters in New York and Washington.”³⁵ The leader of the group is a graphics editor, Hannah Fairfield, who “aims to direct the coverage with an emphasis on visual journalism.”³⁶ Haner himself, when asked about the rationale behind his photographic coverage of climate change, says: “A lot of the iconography that we’ve seen depicting climate change has been very similar. I think many people feel oversaturated with images of glaciers calving into the ocean and polar bears on a piece of ice floating in the sea” (Estrin, 2016).

Is the predominantly narrow and negative visual rhetoric of climate change reflected in the way regular people perceive it? The next chapter examines social media users’ visuals of climate change, and provides a window into the visual public sphere associated with this issue. While negativity is paramount in the visuals used by regular people, there are also aspects of the public’s visual discourse on climate change that would surprise photo editors and broaden their view of how best to communicate about this issue.

³⁵ Hiltner, S. March 16, 2017. “A Sea Change for Climate Coverage”, The New York Times

³⁶ *ibid.*

5. The visual vernacular of climate change in California

5.1. Introduction

After examining the frame builders who influence what kinds of images of climate change are presented to the public, we now turn to the public itself. This chapter presents a mixed-methods content analysis of climate change photographs shared on the image-based mobile social network, Instagram. The rationale here is not to demonstrate causality between what the media publish and what the public in turn “reproduces.” Indeed, following Jay Rosen’s terms, the “people formerly known as the audience” are no longer merely “on the receiving end” but are “viewers who picked up a camera” (Rosen, 2006) and it would be an outdated assumption to make that audience members will take all their cues from the media. The aim of this chapter is rather to examine the visual frames present in the public’s mind, just like the previous chapter examined the frames espoused by photo editors. A central question for this chapter, is the following: is the narrow visual representation of climate change as reduced merely to its most obvious impacts also a feature of social media shared images?

To attempt an answer, I conducted a thematic content analysis of 500 images tagged #California and #climatechange that were publicly available on the social network Instagram between April 2015 and April 2016. In a second stage, a select eight images will be analyzed in detail using visual social semiotics, with the purpose of providing insight into how these images make meaning. The chapter will not only show what sights in the everyday lives of users activate their awareness of climate change as an issue (through the content analysis), but it will also help to shed light on

how these visual vernaculars of climate change are constructed and received by others. As Highfield and Leaver (2015, para. 19) point out, “Instagram offers researchers the opportunity to study how users document elements of their everyday lives, in this case in a predominately visual context, and how these are presented online.” The aim of this section of this dissertation is to discover more precisely how the visual aspects of climate change make their way into regular users’ everyday lives.

Instagram as a locus of the “visual public sphere”

Would it be ambitious to assume that this image-based social network could constitute one of the loci of a new, visual public sphere? Cram, Loehwing, and Lucaites (2016) theorize the possibility of a visual public sphere based on what they call “photographic publicity,” and apply this notion in an examination of citizen-generated images of the Occupy Wall Street protests. Traditional theories of the public sphere, beginning with Habermas (1989), prioritize written and spoken speech over any kind of visual medium, associating visuals with spectatorship - a form of passivity. However, Cram et al. (2016: 229) argue that “changing media necessitate a new conception of the public sphere that moves past the iconoclasm of earlier theories driven by a hermeneutics of suspicion and that embraces the rhetorical potential of visual modes of public address.” They draw on Azoulay (2008) who brought forth the idea of a “civil contract” embedded in photography: “visual interactions function constitutively to create the very civic bonds on which the public sphere and democracy rely for their legitimacy” (Cram et al., 2016:234). The exchange of images on a platform such as Instagram can be described using

Schmidt's (2014) term of "personal publics" existing both around each user profile and theme-based publics organized around a hashtag. According to Bruns and Highfield (2016) this overlapping network of personal publics "in combination constitutes a global patchwork of interconnected micro-publics, tying together social media, face-to-face, and other communication forms and channels, that may be seen as the lowermost foundation of the overall public sphere."

Even if the idea of Instagram as an embodiment of a new, more decentralized (and more democratic) visual-based public sphere is too optimistic, the study of images circulated there by everyday users, labeled by those users as pertaining to a specific issue of public concern, is worthwhile, if only to understand, for the benefit of anyone communicating with the public about this issue and others like it, what the existing audience frames are. Goffman's (1974) approach to framing is interactional, focused on the ways individuals draw on existing experiences to understand new ones. Asplund (2014:3) uses Goffman's theory to analyze audience-based frames of climate change, noting "individuals to interpret information meaningfully apply often unconscious structures that guide their sense making processes."

Instagram as a reliable source of visual vernacular

While textual social media content and structure have been extensively studied (Rambukkana, 2015; Bruns et al., 2013; Bruns & Burgess, 2012; Bruns and Highfield, 2013; Small, 2011; Halavais, 2013; Chew & Eysenbach, 2010), the visual aspect of social networking sites, whether on Twitter, Pinterest, Tumblr, Flickr or Instagram, has only very recently become the focus of scholarly attention (Lewallen

& Behm-Morawitz, 2016; Smith & Sanderson, 2015; Zappavigna, 2016; Alper, 2014; Zhang, Zao & Xu, 2016; Olszanowski, 2015) . This is due to the relative ease of analyzing large volumes of textual data compared to content analysis of images, where the application of objective criteria for coding is more complex.

Researchers have noted the explosion of visual-based social media and tied it to a natural propensity for the visual (Graber, 1996) combined with the relatively recent ubiquity of smartphone cameras. According to Edison Research, 76 percent of United States residents above 12 years of age own a smartphone, and growth in smartphone ownership has risen 660 percent over the span of seven years, from just 10 percent of the population over 12 years of age owning a smartphone in 2009³⁷ (Edison Research, 2016).

Recent studies have focused on the relationship between visual social media participation and use and social interactions (Hochman and Manovich, 2013; Pittmann & Reich, 2016), self-presentation (Geurin-Eagelman & Burch, 2016; Koliska & Roberts, 2015), self-promotion (Moon et al., 2016), body image (Ghaznavi and Taylor, 2015; Tiggeman & Zaccardo, 2016; Lewallen & Behm-Morawitz), witnessing, and attitudes toward specific problems. Hu et al. (2014) conducted a content analysis of 1,000 Instagram photos from 50 randomly selected regular active users and found that there were eight broad content categories: selfies (24 percent), friends (22 percent), activities (15 percent), food (10 percent), gadgets (11 percent), memes (11 percent), fashion (4 percent), and pets (3 percent). Based on this finding,

³⁷ Edison Research and Tritone Digital, The Infinite Dial 2016 report.

they performed a cluster analysis to determine that there are five main types of users on Instagram, based on the content of their posts (See Figure 1).

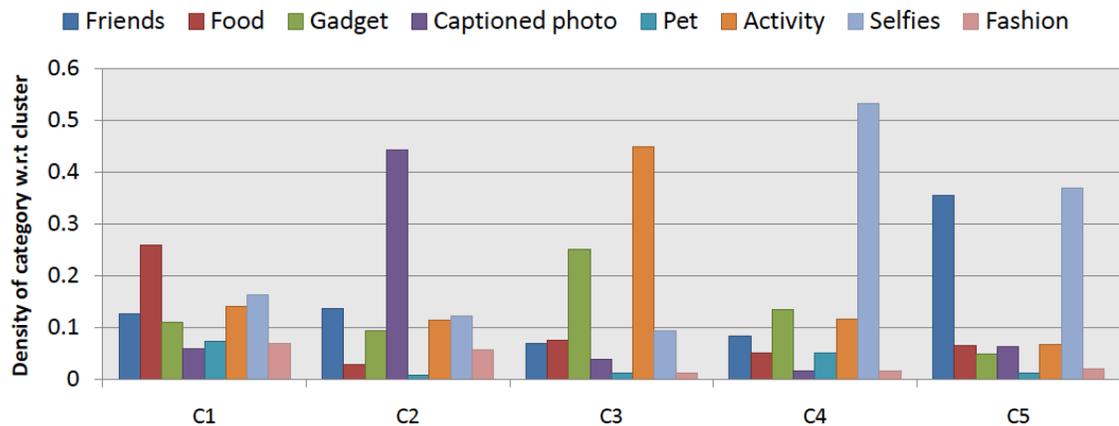


Figure 5.1. Clustering users based on the categories of their photos Source: Hu et al. (2014: 598). Explanation: C1 = cluster of users who post a bit of everything, with an emphasis on food photos. C4 are users whose posts are overwhelmingly comprised of selfies. “Captioned photo” means “meme.”

Highfield & Leaver (2015) called for more research on the visual content shared on social media, “from collecting data from image sharing platforms to (...) processing and analyzing photographs, images or videos.” The current chapter analyses images posted on Instagram only, for several reasons: (1) Pinterest is an image-based site but populated mostly by curated rather than self-taken images, and its use is heavily skewed towards women (44 percent of online women are on Pinterest yet only 16 percent of men – see Pew 2015). Lewallen and Behm-Morawitz even call it “feminized social media” in their study of thinspiration content on that platform. Tumblr is similarly heavily populated by found images, and only 10 percent of Internet users have a Tumblr account, compared to over 20 percent for the other platforms. Flickr is an exclusively image-based site, used by institutions sharing photos of their activities or photography enthusiasts and professionals, who join together in topic-based groups to pool photographs and receive feedback (Garduño

Freeman, 2010; Cox et al., 2011). Some groups exist exclusively for the purpose of gathering users' photos of climate change. One especially noteworthy crowd-sourced initiative is the California King Tides Project,³⁸ where users are invited to document the impact of rising sea levels on their location in California by submitting a photo. Flickr would be a good source of climate change photos to analyze for future research: however, in this project, Instagram was chosen over Flickr because the aim is not to seek out “niches” where people are focused on climate change, but rather to use the hashtag as an “index” allowing the discovery of climate-change related images in social media users' otherwise unrelated collections of photography.

The users whose data is gathered here do not exclusively devote themselves to the documentation of climate change, as they would be if the data had been gathered from a “climate change” photo group on Flickr. In addition, Instagram is more geared towards uploading photos directly from a phone rather than using a computer. Thus Instagram is tied more directly with everyday life. Another image-based platform used mostly for private messaging, Snapchat, was ruled out as its image content is ephemeral and difficult to capture and save for analysis. Finally, the aim of this research is also in part to measure how image posts lead to learning and involvement with climate change as an issue. Much research on social media is fueled by brands who wish to understand their consumer base better and adapt to the changing advertising market by targeting customers where they spend most of their time: on social media. The key metric used to evaluate marketing efficiency is “engagement”, defined loosely as any interaction that a published social media post generates from

³⁸ This group, launched in 2011, can be accessed here: <https://www.flickr.com/groups/1603092@N20/>

other users: on Instagram, this translates into “likes” and comments. A strict definition of the engagement rate is the ratio of likes to followers. In marketing research, Instagram is revered as being the social media platform with the highest rates of engagement, where the same post can generate up to 58 times more engagement from users on Instagram than it will on Facebook.³⁹ In this chapter, hypothesis H4 uses this measurement of engagement, because it is the one that best fit the purpose of this content analysis. This does not mean that likes and comments can capture the same “public engagement” defined as a cognitive, emotional, and behavioral connection with the issue of climate change. These metrics are merely an approximation of the level of response such images can generate.

Sixty-four percent of people in the United States own a smartphone with camera capabilities (Pew 2015), which means the access to photography has been largely democratized and requires very little effort. Considering that Instagram is purposely built to be used as a mobile app, this choice of medium is ideal for the study of images woven into users’ everyday experience. As Gibbs et al. (2015: 258) point out, “the ‘mediatization’ that Instagram affords is interleaved with the materialized practices associated with everyday embodied life.”

The only way users can post a photo to the platform is by selecting an image from their phone’s memory or take one within the app itself. They may or may not add a caption, but most images do have one, consisting of a concatenation of hashtags. Even on Instagram, which is based on communicating with images, verbal information cannot be ignored or considered separately. Not only are the hashtags

³⁹ According to a report published by Forrester Research in April, 2014.

essential “indexing” markers for the image content, but some caption text included by the author may also invite a certain interpretation of the image or make an element of it especially salient. Both images and the text surrounding them have to be considered (Boomgaarden et al., 2016). The few cases in which both text-based and image-based research exists on one topic allow for a potentially deepened understanding of public discourse on complex issues. As an example, Bruns et al. (2013: 895) compared the tweets hashtagged #libya and #egypt in 2011, and found that they “did play a role in informing, organizing, and reporting protest activities in the country.” Later, Kharroub and Bas (2015: 3) studied social media images in the 2011 Egyptian revolution, “in order to understand the potential of images to elicit emotional responses and possibly a sense of efficacy that could fuel and maintain a revolution” and found that there was a stronger “focus on positive, uniting, and efficacy-eliciting visual content than emotional and negatively compelling images” (Kharroub and Bas, 2015: 17). Most studies of social media shared content have to do with political unrest, elections, and protest (Alanyali et al., 2016). However, the same sources can be studied in the case of ongoing crises such as global climate change, a phenomenon which crosses the boundaries of environmental, economic, and political fields.

Connor et al. (2016: 464) point out that in the climate change communication research field, much attention has been focused on the efficacy (or lack thereof) of top-down messages directed to the public by institutional actors. However, “micro-level interpersonal communication (...) between members of online social networks, and its potentially significant role in engaging the public with climate change” has not been studied as much. This trend is now changing; for several years now, researchers

have harnessed Twitter as a tool to gauge public sentiment and attitude toward climate change (Kirilenko & Stepchenkova, 2014; Cody et al., 2015; Holmberg & Hellsten, 2015; Kirilenko et al., 2015; Jang & Hart, 2015; Connor et al., 2016).

However, there is relatively little evidence that citizens are participating in a many-to-many discussion forum on key global issues such as climate change; thus, gatekeepers remain critical. One key finding from an analysis of 1.8 million tweets on “climate change” and “global warming” in five languages by Kirilenko & Stepchenkova (2014:180) is that “the online climate change discussion seems to be highly concentrated and mainly representing the views expressed by elite journalists, organizations, and celebrities.” This result would seem to indicate that Twitter users depend highly on messages spread by the “elite press” and other opinion leaders, validating a “two-step flow” theory of communication rather than an “active audience” approach that posits a new, decentralized public (Kirilenko & Stepchenkova, 2014:181). While this is distinctive from early, utopian views of the internet as enabling horizontal, many-to-many communication, the work by Kirilenko and Stepchenkova is still critical in demonstrating the power of the communicative affordances of the internet in amplifying conversations about climate change.

Given the rising interest in image-sharing platforms as well as the studies on the citizen exchange of information relating to climate change on social media, it is clear there is a need to consider the visual public discourse. In this chapter, I will analyze this visual vernacular of climate change in citizen-generated images that Instagram users subjectively choose to tag as related to climate change. This will offer not only information relating to the central inquiry in the thesis of how climate-

change images relate to engagement with the issue, but also suggest a new way to analyze the circulation of images among citizens in relation to key political and global issues. As visual communication becomes increasingly popular with the rise of ICTs, the ability to understand and measure a visual public discourse or visual vernacular is increasingly important.

This chapter presents an analysis of the visual public discourse, or visual vernacular of climate change. Because of inherent differences in the architectures of Twitter and Instagram, this study will not be able to confirm or disprove Kirilenko & Stepchenkova's main finding about the role of elite users and journalists in setting the tone and agenda. Instagram as a platform does not support reposting images from other users. This functionality is not included because of copyright concerns related to images. Therefore, it is a property of the application itself, rather than a consequence of user choices, that very few users recirculate photos from other sources than their own phone camera. The few exceptions to the rule (created using third party apps) will be described in section 5.3.

The hashtag as a built-in tool for research

Fortunately for researchers, most social media platforms feature a built-in tagging system, whereby users employ hashtags (words or strings of words preceded with the # symbol) to enhance the visibility of their photo in searches. Instagram, offered to the public as a free image-sharing mobile application in October 2010, launched hashtag functionality in January 2011 and openly encourages users to add hashtags to their posts, as “a great way to find new followers and share your photos with more

people.”⁴⁰ Hashtags on Instagram are hyperlinked keywords (with a limit of 30) that users add to their image caption, often consciously tapping into popular trends. Although these numbers evolve constantly, one reliable statistical analysis of more than 120,000 images performed in March 2014 by software engineer Max Wolf showed that most photos had about 5 hashtags.⁴¹ Marketing research has shown that hashtag use improves engagement by 12.6 percent on average.⁴² As Bonilla & Rosa (2015) clarify, a hashtag serves both the “clerical” function of simplifying post retrieval, as well as a “semiotic” function whereby a post is “framed” as belonging and being relevant to a certain conversation thanks to the inclusion of a hashtag.

Relevant studies using the hashtag as a point of entry

The widespread usage of hashtags among social media users⁴³ makes them a potentially rich resource for scholars who may wish to analyze the popularity, timeliness and collective representation of a certain topic, person, phenomenon, or problem. Recently, such hashtag-search based studies have also been conducted on exclusively visual social media. Researchers have examined topics like anorexia, social construction of funerals, and the public response to the Ferguson police shooting of Michael Brown as they are shared on image-based social media. In each case, researchers sought to answer a similar question to the one asked here: what image of the given phenomenon or issue emerges from social media? Ghaznavi &

⁴⁰ Instagram Blog, “Instagram Tips: Using Hashtags”, February 15, 2012.

⁴¹ Wolf, Max. “Does Adding Many Tags to an Instagram Photo Maximize the Number of Likes?” March 24, 2014. <http://minimaxir.com/2014/03/hashtag-tag/> [Accessed April 21, 2016]

⁴² Simply Measured, Q3 2014 Instagram Study, p. 12.

⁴³ In 2013, a RadiumOne report found 57.9 percent of social media users employ hashtags. Source: radiumone.com, March 2013.

Taylor (2015) studied 300 images shared on Twitter and Pinterest tagged with either #thinspiration or #thinspo and found that these images promote an “objectified, sexual, and extremely thin depiction of the thin ideal” (Ghaznavi & Taylor, 2015: 60). While they admit that their content analysis cannot lead to a demonstration of effects on self-image among the young women who share and view content with these tags, their analysis does confirm that thinspiration content persists on social media, managing to evade restrictions targeting this sort of content. Similarly, in their study of the self-harm community of image sharers on Instagram, Moreno et al. (2016) found that hashtags are constantly evolving to evade censorship, so that only one third of the 18 hashtags leading to self-harm content prompted a “Content Advisory Warning” from the Instagram application (Moreno et al., 2016: 81). Studying a less controversial topic, Gibbs et al. (2015) collected 1330 images tagged #funeral, discovering that the most prevalent images thus labeled are “individual portraits, group images, and images of funeral rituals and funeral materials” (Gibbs et al., 2015: 264). Their thematic content analysis of the Instagram “platform vernacular” through the prism of the #funeral hashtag led them to conclude that the use of Instagram in the funeral context “acts as a form of presencing, communicating a person's emotional circumstances and affective context” (Gibbs et al., 2015: 266). Other very recent studies have emerged analyzing the themes present in Instagram shared images of the Ebola virus epidemic (Seltzer et al., 2015) and the Ferguson police shooting (Hitlin & Holcomb, 2015). The Pew study conducted by Hitlin and Holcomb found significant differences in the content of posts tagged with #Ferguson on Twitter and on Instagram. The ones posted on Instagram are much less directly related to the

Ferguson shooting of Michael Brown and more broadly to race, social justice, and police brutality. Thus, the study shows that tagging conventions can be very different from one platform to another. Similarly, Seltzer et al. (2015) in their analysis of images tagged with #Ebola on Instagram and Flickr found the platforms are used in different ways, with Instagram containing significantly more light-natured posts (jokes) and Flickr containing more serious photographs, mainly depicting health care workers (Seltzer et al., 2015: 1274).

These studies show that analyzing a subset of Instagram posts by hashtag is a productive way of learning about image-based social interaction; indeed, if there is a “visual public sphere” on Instagram, hashtags would be its particular salons, where individuals having something to say (in this case, show) about a given topic would go to mingle with others. Hashtags are constantly changing and adapting to the publics that cluster around them: thus, for #climatechange (325,000 posts), alternatives include #climateaction (23,000 posts), #climatechangeisreal (17,000 posts), #climatemarch (20,000 posts), and #climatejustice (11,000 posts). Despite the very recent surge in research on Instagram, as described above, no study has yet been conducted of the way users visualize climate change on this platform. The research hypotheses are detailed below.

Research hypotheses

In order to make the results comparable with what emerged from the interviews with Californian newspaper photo editors, this study also focuses on images of climate change in California. The narrowing of focus in these two chapters on the newspaper universe and social media users in one state serves to create a better correspondence

between the findings in each chapter. As a case study, California is particularly interesting when it comes to climate change, as it is both already suffering from the impacts of climate change and is one of the most proactive states (also at the international level, if it was its own country) in taking decisive action to curb carbon dioxide emissions. Thus, if there is a place where visual communication about climate change should find fertile ground, it is here. This chapter sets out to test several hypotheses about Californians' use of Instagram to document what they perceive as climate change in their daily lives. These hypotheses will be tested using quantitative content analysis, following which select posts will be explored more in-depth using social semiotic analysis. Below is a detailed description of each hypothesis and the rationale behind it.

H1: Most of the posts will present impacts of climate change, rather than causes or solutions.

This hypothesis builds on the fact that interviewed photo editors conceived of climate change in California as mostly the unfolding of its negative impacts on local nature and natural resources (see chapter 4). Therefore, it is probable that there will be more posts depicting negative aspects or consequences of climate change and fewer portraying positive steps taken by humans in response to this phenomenon. It is expected that very few pictures will point to specific bad actors or causes of climate change, as even in the media these tend to be under-represented (Rebich-Hespanha et al., 2015: 512). After reporting the results of editor interviews in Chapter 2, it will

now be opportune to compare and contrast their visual framing of climate change with that practiced by the public.

H2: Users will associate negative rather than positive emotions with climate change.

Because it is expected that users associate “climate change” with the negative impacts of climate change on their environment, a corollary is that sentiments expressed in the user-created image captions will be predominantly negative (disappointed, fearful, angry, disenchanted, nostalgic) in tone.

H3: A minority of posts will highlight human agency.

It is likely that in the majority of posts, climate change will be construed as an event happening to humans, rather than something humans have to take responsibility for or are actively dealing with. The “agency” and “focus” variables are essential here. The agency variable describes whether the image depicts the actions or effects of human actions on the climate. The related focus variable allows a distinction to be made between the images that feature nature only as the locus of climate change, and those that include human life and society.

H4: The images of climate change will not generate significant engagement.

Despite Instagram overall generating high rates of engagement (measured by likes and comments on a post), it is expected that climate change images will not usher in waves of relevant discussion among commenters or even attract a high number of “likes.” The “likes” and “comments” variables will be essential here, with the number of followers used as a control. The minority of posts that do feature comments will be analyzed to determine the relevance of the comments to climate change.

5.2. Methodological notes

Data collection

According to Pew, 28 percent of Internet users in the United States have an Instagram account. Pew data also shows that the population of Instagram (400 million and growing as of January 2016) is predominantly young (18-34) and relatively equally distributed in terms of education and income levels.

As detailed in Table 1 below, the post selection process was divided into two stages. At first, a Python script was used to query the Instagram API with specified search criteria. This generated 1577 images posted between April 2015 and April 2016. 2015 was an eventful year in terms of weather extremes that could be traced back to climate change: in April, the snow pack in the Sierra Nevada mountains was at an all-time low, California experienced its hottest June, and September saw devastating wildfires ravage northern parts of the state. The time span also includes the 21st Conference of Parties summit held in Paris in early December 2015, which marked the apex of public notice of and attention to climate change during the

surveyed time (Google Trends; See Figure 2 below). Later, these images were hand filtered using additional criteria, detailed below and in Table 1, until 500 images remained. This number of units of analysis has been shown sufficient for “appropriate breadth and evaluation and saturation of themes in content analysis” (Moreno et al., 2016: 79). Only photographs without text imprinted on them were analyzed; whereas interesting for social science, memes (photographs with superimposed text, usually in the form of a quip or slogan) were not included here as they are not photographs taken by the author but typically stock photos or photos from entertainment media retrieved by users from Internet search engines. Nonetheless, future research isolating the social media memes on climate change would be of high import, as the images circulated in memes are usually highly symbolic.

Photo selection process			
First stage: API query		Second stage: manual filtering	
Followers	<1000	User	Not an institution, professional photographer or advocacy group
Dates	04/01/2015-04/23/2016	Post	Must be a photograph
Hashtags	#climatechange AND #california		No superimposed text (meme)
	<20 hashtags		
	Total: 1577	Total: 500	

Table 5.1. Data collection process.

In a way, although much less work intensive for the researcher, this method is similar to the newly popular qualitative research method of photovoice. In this technique, the researcher enters a community and gives participants cameras, asking them to photograph anything in their surroundings that resonates with a theme or question posed by the researcher, during a set period of time. This technique has been used in relation to climate change: Baldwin and Chandler (2010:640) for example, employed it in Australia, emphasizing that photovoice “functions to empower the participants as it is “respondent generated data.”” O’Neill and Smith (2014: 83) commented on the

validity of that project, by saying that they provide “insight into the social and cultural dimensions of adaptation to climate change, highlighting how sea-level rise poses a threat to things which people value.”⁴⁴ Here, the researcher uses photographs already produced or shared by the community of users. The downside of this approach is the impossibility of purposeful demographic sampling and the lack of reflective discussion with participants about the reasons behind their photographs. The upside, however, is that the images can in no way be influenced by the researcher's intent to study common visualizations of climate change, as they are merely collected from already existing photostreams.

Several limitations were imposed on the images collected into the sample: firstly, no images were taken from Instagram “celebrities,” that is users with over 1,000 followers. Although this figure (1,000 followers) may be perceived as a somewhat arbitrary cut-off point, it is the number used internally by Instagram staff.⁴⁵ Secondly, images shared by professional photographers or images shared by individuals or groups exclusively devoted to conservation or environmental protection were also omitted. Thus, the sample is composed of photographs shared by individuals who, while they may be environmentally aware, are not explicitly activists nor professional image creators. Their images of climate change could therefore be construed to be part of their everyday life observations.

⁴⁴ O’Neill went on to conduct her own photo-elicitation project in Australia, the results of which can be viewed in the short video produced by Tom Lowe: <https://vimeo.com/83484905> [Accessed July 12, 2016]

⁴⁵ Blatt, Lindsay. Email communication to author, April 4, 2016. Lindsay Blatt is a Curator at Instagram.

Associated themes: #globalwarming, #sustainability, #drought

A Google Trends search was performed⁴⁶ before establishing the final selection of hashtags to study. Indeed, climate change is a complex phenomenon with many associated terms that users might think of when posting a photo to Instagram: why not examine images with the tags #drought, #sustainability, #weather, #energy, #globalwarming?

The hashtag #globalwarming is the most obvious rival for the one used here, #climatechange. A first observation of Instagram shows that there are fewer images tagged #globalwarming (280,000) compared to #climatechange (325,000). Gann & Matlock (2014:509) mined conservative and progressive news sources and found that despite significant overlap among the two terms, there is “greater polarization within the conservative corpus in regards to which term is used.” Leiserowitz et al. (2014) found that “global warming” carried a predominantly negative connotation. Jang & Hart (2015) confirmed this in their analysis of two years worth of tweets from four English-speaking countries: “when users discussed global climate change in terms of hoax frames, they preferred “global warming” to “climate change.” (Jang & Hart, 2015:16). Thus, using “global warming” may have skewed the data towards posts that were dismissive of climate change or that lay at a certain extreme of the public discussion surrounding climate change. Moreover, since this study aims to consider the phenomenon in all its aspects: causes, impacts, and responses, “climate change” seems more appropriate because “global warming” skews interpretation towards the adverse impacts of the phenomenon alone. Google Trends data from 2004 to the

⁴⁶ Search on trends.google.com performed April 24, 2016.

present day shows that while “global warming” was the more popular search term at first, the two have been used similarly often since mid-2014 (See Figure 2 below).

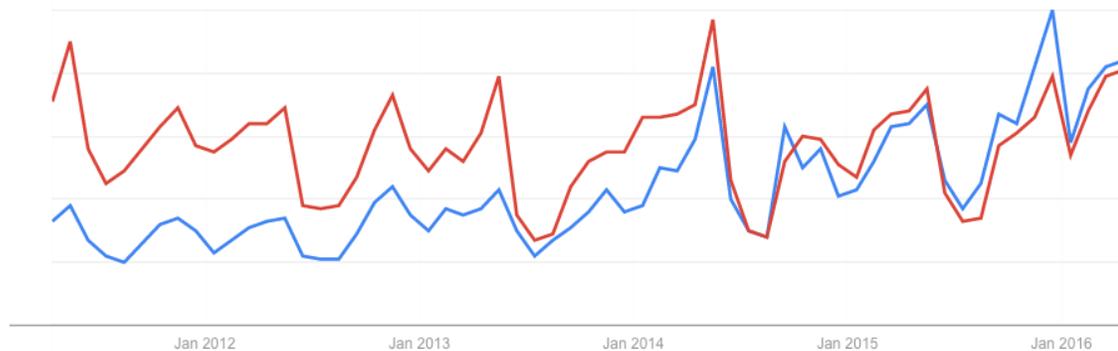


Figure 5.2. A Google Trends query was performed showing the relative popularity of the search terms “global warming” (in red) and “climate change” (in blue) from April 2011 to April 2016.

The term “drought” is at least three times as popular in terms of Internet searches in California than “climate change.” However, drought is not a direct result of climate change but merely a naturally occurring phenomenon that will be more and more intensified because of anthropogenic climate change (Williams et al., 2015). Even if drought was a pure climate change impact, this study attempts to include all aspects of climate change including causes, impacts and solutions. Thus, analyzing only #drought posts would reduce the scope of this study to a negative effect of climate change. It is expected that the #drought hashtag will come up in searches for pictures tagged #climatechange and #california.

The term “energy” was excluded because of possible ambiguity with energy as a descriptor of physical health or enthusiasm rather than a type of fuel. The word “sustainability” was excluded because Google Trends data shows it to be 4-8 times less popular as a search term than “climate change.”

Coding scheme

Eleven variables were coded for each image. Five were self-explanatory: date, user follower count, like count (for the post), tag count (for the post), number of comments. The remaining six were more complex and tailored to the research questions: “Source” described whether the photo was user-created or found. “Theme”, arguably the most important variable, had four possible values: cause (1), impact (2), response (3), and unrelated (4). This variable gauged the content of the photo with respect to climate change. “Agency” described whether the photo depicted someone doing something to cause or counter climate change. A related variable, “Focus” was coded 0 if the photo represented only nature and 1 if some trace of human presence was included. “Sentiment” was a measure of the main emotional tone of the caption posted by the author: positive, negative or neutral. Finally, the “Comments Relevant” variable showed whether among the comments there were any substantial statements made about climate change, or whether the comments pertained to something else, like the quality of the photo or the author’s looks. The five self-explanatory categories mentioned above were automatically generated by the Instagram API. The “source” category was determined based on caption indications of the picture having been re-posted, with the default assumption being that the picture was generated by the user. The “sentiment” category was coded by checking each caption against positives and negatives lists provided by Liu (2012). A more robust sentiment analysis tool could have been used, such as the one developed by Pak & Paroubi (2015), if the captions were limited to a short block of text (as on Twitter). The three variables potentially vulnerable to subjective coder interpretation

(Theme, Agency, and Focus) were tested for reliability by performing an inter-coder reliability test with one independent coder on a random subset of 10 percent of the data. The highest Krippendorff's alpha achieved for any variable (Focus) was 0.905. The average Krippendorff's alpha for all three variables was 0.798 which lies just at the 0.800 threshold of acceptability (Krippendorff 2004:241). In addition, since all the 500 units of data were coded by one person, there is no problem with internal consistency of the coding.

Limitations

As Highfield & Leaver (2015) point out, analyzing Instagram data is challenging. One of the reasons for this is that an Instagram post, like a tweet, is constantly gathering external input – even though at the time of collection, a photo post may have had no engagement (no likes and no comments), it may gain likes and/or comments at a later time or some likes and comments may be removed. In addition, unlike on Twitter, where a tweet cannot be edited, but only deleted, the post itself can change over time. A caption can be empty one day and contain five sentences the next day, for the same post with the same time stamp. For this reason, the photos in this sample were collected at least two weeks after their initial posting to the social media platform, to allow enough time for the content to “settle” and for likes and comments to appear. An additional complication is that while this study excluded all users who had more than 1,000 followers, some of the users sampled gained more followers over time, so that if they were to be analyzed now, they would no longer qualify to have their posts included in the analysis. In the interest of simplification, this study

assumes that what counts is the fact that the user was not an “Instagram celebrity” at the time of data sampling.

As is the case with any set of “found data,” the sample is necessarily limited in terms of its representativeness. It is difficult to conclusively establish a demographic profile of users whose Instagram posts have been sampled. What can be offered is at best an educated guess, based on overall Instagram demographics. Fortunately, Instagram has developed quickly from its launch in 2010 into a medium that is broadly used by various demographics, with the overall profile being young: only 17 percent of Internet users above the age of 50 use Instagram, while 53 percent of users aged 18-29 report using it (Duggan, 2015: 12). Aside from age, the other categories are represented remarkably evenly: income, education level, urban/rural, and gender (Duggan, 2015). The Pew report also shows a slight imbalance exists in terms of race, since only 21 percent of white Internet users are on Instagram, while the percentage is notably higher among Hispanics (38 percent) and Blacks (47 percent). Nonetheless, the exact demographic makeup of this particular sample of 300 users remains largely unknown and could turn out to be only a specific subset of that broad demographic of Instagram users. The precautions taken in selecting posts (leaving out “superusers”, institutional accounts, professional environmental photographers, and spammers) cannot make up for all of these limitations. Another potential issue is that images tagged #california do not necessarily originate from users who live in California, but could belong to visitors. This however appears to be a negligible portion of the users sampled. In all cases where such a suspicion existed, the user’s account was checked for a base location in their profile and to see whether

the majority of their posts are from elsewhere. Pictures from such users, who posted predominantly from outside California, were omitted from the data set.

Ethical Considerations

At the moment of sampling, all the posts featured in this analysis were publicly available for any user to view online. Approximately 57 percent of all Instagram accounts are set to “public,”⁴⁷ which means their content is searchable and available online, as opposed to content featured in “private” accounts, hidden from search results and requiring the user’s approval to be viewed. The Institutional Review Board has judged that this study does not constitute an example of Human Subject Research⁴⁸, and therefore it has been deemed exempt from review. No direct interaction occurred between the researcher and the users whose photos have been sampled. However, following the Ethics recommendations of the Association of Internet Researchers, one must bear in mind that “people may operate in public spaces but maintain strong perceptions or expectations of privacy” and that “search tools make information accessible to a wider public than what might have been originally intended” (Markham & Buchanan, 2012: 6-7). Therefore, the posts reproduced here for illustrative purposes have been purposefully edited to obscure the usernames of both the post author and commenters, so that privacy is not an issue.

⁴⁷ According to a survey of 10,000 Instagram users conducted by Melchior Schöller of VoicePolls in February 2015.

⁴⁸ Decision letter issued April 12 2016 by University of Maryland, College Park IRB Office.

5.3. Results

A preliminary observation of the data shows that throughout the year under study, users posted pictures with the two relevant hashtags on a regular basis, with the two only exceptions being April 2015 and January 2016. In April 2015, there is a higher than average volume of posts, probably due to the discovery of extremely low snowpack in California and Governor Jerry’s Brown historic decision to order mandatory restrictions in water usage. In January 2016, the dip in climate change related posts corresponds to a very high interest for El Niño in online searches (as shown on Google Trends). During that month, California reported an unexpected reversal of the usual El Niño effects: the South of the state remained dry while the North received substantial rainfall, restoring water levels in reservoirs, so much so that the mandatory water restrictions were lifted in May. Figure 3 shows the distribution of images in the dataset by month.

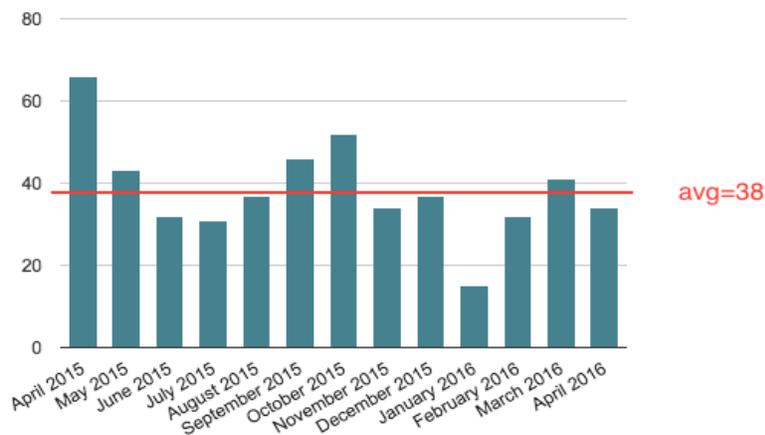


Figure 5.3. Number of posts in the dataset by month posted.

As expected, an overwhelming majority of pictures (83 percent) are self-taken. As mentioned above, this is due to the nature of the platform, thus prohibiting any further conclusions as to the shareability of media images of climate change. The

2016 Climate Outreach report on Climate Visuals (Corner et al., 2016) found that participants would be most likely to share on social media classical images of causes (a photograph of a forest burning scored 3.59 out of 5), impacts (stranded polar bear scored 3.85 out of 5; an American street covered in floodwaters scored 3.63) and solutions (a photo showing people in India installing solar panels on a roof scored 3.52). In the current sample, only 85 out of 500, or 17 percent of the images have been re-posted from an external source using third party apps. Most reposted images were photographs of the Salton Sea’s faltering ecosystem taken by National Geographic photographer Gerd Ludwig. Ludwig captioned one of his immensely popular images thus: “The fluctuation in sea level and increased salinity of the Salton Sea have led to an environmental decay that is now nearing catastrophic dimensions. I’ve photographed the Salton Sea repeatedly over the past years and witnessed many changes over time.” It is worth noting that these immensely popular images were reposted by several major Instagram users (@thephotosociety with 4 million followers and @natgeo with 55 million, among others), which helps to explain why they were reposted so often by “regular” users studied here.

The four hypotheses formulated above were tested by analyzing the data; H1, H3 and H4 were confirmed and H2 was partially confirmed. Below is a detailed description of the results.

H1: Most of the posts will present impacts of climate change, rather than causes or solutions - CONFIRMED

The first and most important finding is that 46 percent of the images show various aspects of the California drought, which shows that to Californians, seeing climate change means predominantly noticing the physical manifestations of drought. Thus, while this study explicitly only searched for images tagged #climatechange and #california, almost half of them also include the #drought tag. This echoes a finding from the previous chapter: all photo editors from Californian papers, big or small, emphasized the importance of covering the drought, though not necessarily in the context of climate change. Altogether, 56 percent are pictures of drought and other weather phenomena the intensification of which may be linked to climate change, such as wildfires or especially violent El Niño storms. Pictures of solutions and positive action taken to mitigate or adapt to climate change are rare (18 percent). Pictures of causes (contributing factors or bad actors) are exceedingly rare (4 percent). Finally, about 20 percent of the photos are not related to climate change in any appreciable way. Mann-Whitney tests found no statistically significant relationship between the aspect of the photo shared and the number of likes (controlling for followers) received.

H2: Users will associate negative rather than positive emotions with climate change – PARTIALLY CONFIRMED

The majority of captions (305/500) are neutral, not indicating any emotion or conveying both negative and positive emotions. These captions are mostly statements of fact, such as “Summer afternoons in Santa Cruz” or #tonights #sunset with #clouds” Of the remaining 193 captions, 142 are negative in tone. Below are a few examples of negative and positive captions.

Negative	Positive
the terrible news of the wildfires in Northern California gives me sadness (...)"	"excited to start research on climate change and policy as an intern in California state senator Robert Hertzberg's district office."
"epic hiking but sad to see the impact of climate change hardly any water left in the rivers wildlife will disappear and fires take over (...)"	Great to work with my colleagues on the Local Government Commission to help build a #sustainable future for #California
"the devastation of Washoe Lake. Dead fish everywhere! It was shocking when I first saw it all."	"Yay yay yay much needed rain"

Table 5.2. Examples of negative and positive captions in the dataset. Emotion was determined by cross-checking the caption against a list of negative and positive opinion words provided by Liu (2012).

H2 stated that users will associate negative rather than positive emotions with the climate change phenomenon. In fact, most captions do not carry emotion-laden words. Therefore, this hypothesis is partially confirmed, as it appears that most images do not convey strong emotions, yet among those that do, most are negative, as predicted by H2. Importantly, if one looks at the distribution of emotions by focus (whether human society is present in any way or whether the photo shows nature alone), it appears that negative emotions are mostly included alongside pictures of nature alone.

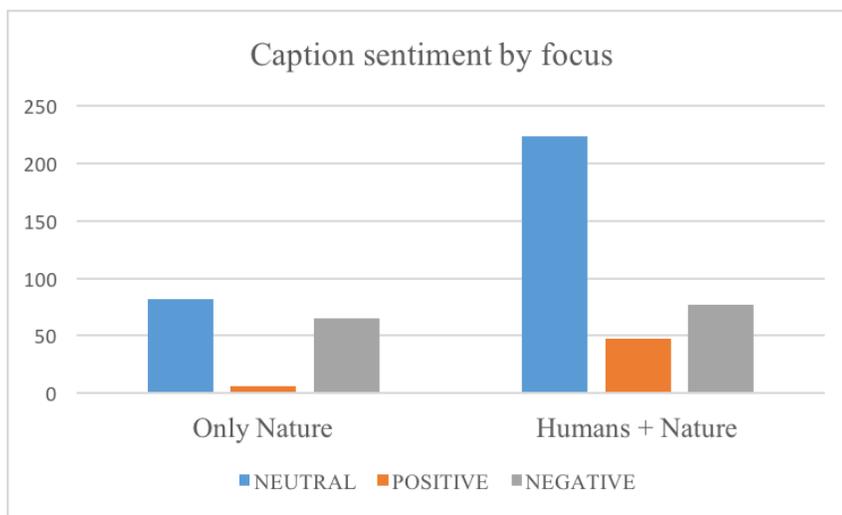


Figure 5.4. Distribution of emotions in the captions by focus of the photo.

As Figure 4 shows, there are hardly any positive captions in the photos that focus on nature alone. Conversely, the proportion of negative captions is higher in this category (65 out of 153) than it is in the Humans + Nature category (77 out of 347). In a related finding, only one out of all 92 photos in the “Solutions” theme was captioned negatively.

H3: A minority of posts will highlight human agency - CONFIRMED

As was expected, 75 percent of pictures show no agency. They illustrate a state of affairs that is simply passively observed or suffered by humans (rather than caused by, shaped by, influenced by, or responded to by them). This finding is related to the theme category, where 56 percent are photos of impacts. A related category, called “Focus”, measured whether the image represented a scene of “pure” nature without any visible traces of human presence whatsoever. Here, the findings are quite interesting. First, a Mann-Whitney U test, which is a t-test used when the data are not normally distributed, was conducted, to determine whether photos with humans present in them are more or less popular than those depicting nature alone. The test demonstrated, contrary to expectations, that there is a statistically significant difference between the two groups in terms of average number of likes ($W = 20758$, $p = 0.0001$): those that include humans are less popular on average. The test was conducted by comparing the likes to followers ratio for all the posts in the “Humans” category under the Focus variable with the likes to followers ratio of the “Nature only” posts. While the difference is statistically significant and the Nature only posts have a higher engagement rate, the difference is very small (mean engagement rate

for these posts is 0.11 while that of Humans posts is 0.1). This calls into question previous findings, such as Corner et al. (2015) who established that the presence of humans in a photo is invariably more engaging. Another finding, which is less surprising, is that a breakdown of Nature/Human photographs by theme shows that while the impacts category is split in half between images including humans and those showing nature alone, the solutions category is almost exclusively composed of images featuring humans or a trace of human activity. This is summarized in Figure 5.

H4: The images of climate change will not generate significant engagement -
CONFIRMED

The most common statistic used in evaluating a user’s success on Instagram is not the follower count, but the engagement rate, measured by the number of likes and/or comments divided by the number of followers. In this sample, engagement rate was relatively low – 0.06%. Overall, the average number of followers in the sample is 312. Thus, the 0.06% engagement rate is very low compared to the average

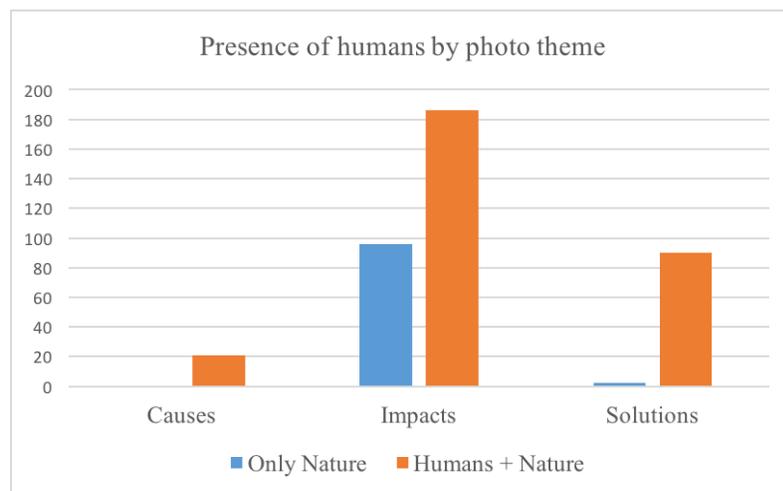


Figure 5.5. Presence of humans by photo theme

engagement rate for accounts with less than 1,000 followers, which is 8%.⁴⁹ When broken down by theme, it appears that photos of Impacts were slightly more popular on average. Figure 6 shows the average number of likes by theme.

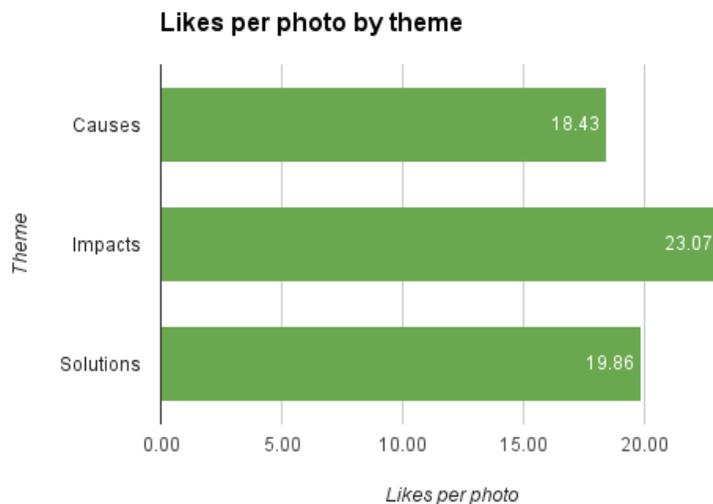


Figure 5.6. Average number of likes by theme. Number of followers is relatively stable across the three themes (Causes=303, Impacts=339, Solutions=295), making the results easily comparable.

At this point, it is important to note a potential limitation of measuring engagement with climate change on Instagram through the standard indicators of user engagement on this platform. Indeed, as most of the photographs showing causes or impacts of climate change plausibly represent something viewers disapprove of or find disappointing, the meaning of a “like” attributed to such a photograph is elusive. It is probable that some such photographs did not receive “likes,” and therefore had lower engagement rates, not because the viewers did not appreciate the photographs, but because they dis-like the content of the photograph. Indeed, “likes” can be skewed to what people find to be inspiring/positive in a picture rather than what they

⁴⁹ Chen, Y. (2016). The Rise of “Micro-Influencers on Instagram.” Statistics by Markerly.

find to be a good photograph. This shows that the idea of engagement as defined by marketing experts is radically impoverished compared to the concept of “public engagement” with an issue. In order to gauge a deeper form of engagement, requiring more action than simply clicking on the heart symbol below the photo, the number and content of comments also were analyzed. The first finding here is that 225 photos, almost half of the data set, received no comments at all. Of those that do have comments, only 76 posts feature comments that pertain to climate change as a subject.

5.4. Social semiotic analysis of selected posts

The frequency analysis of themes and other measurements described in the hypotheses above provide an overall view of the data. As a reminder, the 500 images studied here are not a sample of the data, but rather a collection of all the images posted to Instagram during one year with the relevant hashtags by regular (non-celebrity, individual, amateur) users. However, there are limits to understanding the way individuals in California use mobile imagery to represent climate change using purely quantitative descriptive statistics. Important questions remain to which aggregated, quantified results cannot provide an answer.

In this section, eight noteworthy images from the dataset of 500 will be analyzed in detail, following the social semiotic framework laid out by Harrison (2003) and Jewitt & Oyama (2001). This section is a qualitative, in-depth exploration of the various ways in which people communicate about climate change (and its various aspects) visually. It serves a double function of describing the image dataset without

presenting all 500 images, and allowing for a qualitative analysis of the ways in which people visualize climate change. What social uses, what additional meanings are embedded within social media shared images of climate change? According to Pachler et al. (2010: 186), a social semiotic analysis seems the most appropriate to answer such questions, since “a choice to take a photograph with a convergent device and to send that image, rather than writing (...) a text about the bit of world framed in the image, is a choice about meaning.” As mentioned in the introduction to this chapter, Instagram is an opportune medium to study the “visual vernacular” of any given phenomenon, since it is a natively mobile application that “lives”, as it were, in people’s pockets, remaining always at arm’s reach (Gibbs et al., 2015). Pachler et al. (2010:194) underlined this even before Instagram as such existed, when discussing the affordances of smartphones equipped with cameras and big, colorful screens: “many more images of everyday life are captured with this device rather than with a digital camera; representing reality by selecting and ‘capturing’ becomes a ‘naturalized’ activity.”

Considering that Instagram is a “social” medium, where people share images with known and unknown others, a social semiotic analysis is justified. Not only does social semiotics allow the researcher to consider meaning-making in the context of social interaction, it also provides a mechanism for analyzing the “coupling” of words and images, which in the case of Instagram posts can rarely be considered separately. Even in those cases where no caption is provided, all the images in the corpus have text included in the caption in the form of hashtags, and sometimes also in the image itself, for example if the image depicts someone holding a banner with text on it. The

three metafunctions performed by an image, according to Kress and Van Leeuwen (1996) and Harrison (2003), are the following:

1. Representational – responding to the question: What is the picture about?
2. Interpersonal – responding to the question: How does the picture engage the viewer?
3. Compositional – responding to the question: How does the composition of the picture work integrate the two functions above?

Four of the posts reproduced and discussed below are representative of the overall dataset and four are outliers. The Impacts section contains an analysis of four images, as it is the most often encountered them in the dataset. The specific methodology followed here is laid out in detail by Harrison (2003).

Causes

Causes posts are very rare in the dataset: only 21 out of 500 fit this thematical category. This scarcity is discussed above as a finding of its own. Because of this small number of “Cause” posts, finding a “typical” cause post as opposed to an unusual one is not easy. Instead, a variety of posts will be analyzed so as to gain a deeper form of understanding of user practices in visual cataloguing of climate change causes through Instagram.



Figure 5.7. Image posted on December 2, 2015. Location: Near Bakersfield, CA.

This image shows an oil well in the middle of an arid desert landscape. The picture's lack of sharpness can be understood as motion blur; the white spots on the left side suggest that it was taken through a window, from a car driving by. The visual pattern used here is narrative: an action (that of extracting oil) is going on. Yet it is also conceptual: the well is an object that represents one of the main causes of climate change. In analyzing any image, it is important to understand not just what the image shows "on the surface", but also what symbolic meaning it may carry. To this end, it is useful to identify the denotative/connotative levels of the image.⁵⁰ On a denotative level, this is a picture of an oil well extracting oil, simply doing what it was designed to do. However on a connotative level, which is emphasized by the caption, this oil well stands in for causes of climate change. In fact, Bakersfield, California has one of

⁵⁰ See Chapter 2, in the section entitled „Role of visual images in public engagement with climate change”, for definitions of denotation and connotation in semiotic image theory.

the highest levels of air pollution in the US.⁵¹ The stylistic decision to take the image from a car implies a heightened distance between the picture-taker and the represented object: he or she will not even stop to capture this view, but is rather in a hurry to get away from it. Further, the angle of the photo is direct, eye-level – which implies a feeling of confrontation with, rather than submission to or control over, the “evil” at hand (i.e., the oil rig). The lack of any human figure on the picture is also noteworthy, even though it may not be the result of choice on the part of the picture-taker: it makes the rig completely de-humanized, so that the agency of humans in extracting fossil fuels is not tied to a human figure or face. In addition the caption, by its tone, indicates another form of distancing, even disavowal, between the picture-taker and the sight captured: “Hoping with the outcome of #cop21 this will soon be an ancient sight.” In terms of the compositional metafunction, it is clear that the only salient object in the photo is the rig itself, so that the viewer’s gaze concentrates on it, while the caption induces a negative emotion toward it and what it stands for.

⁵¹ According to a report produced by the American Lung Association:
<http://www.stateoftheair.org/2015/city-rankings/most-polluted-cities.html> [Accessed August 24, 2016]



Figure 5.8. This picture was posted on September 15, 2015. Location: La Quinta, CA.

Figure 8 shows another “cause” of climate change, but a different one than the extraction of fossil fuels: the waste of water. On a purely denotative level, the image shows a pleasant park with a pond and adjacent residential buildings on the backdrop of imposing, inhospitable, and dry mountains. The aridity and harshness of the mountains contrasts vividly with the idyllic scene in the foreground. However, the foreground carries an eerie absence: that of humans for whom this carefully landscaped park was built. The caption’s wording also points to what is missing, but in a different way: “no sign of water conservation in California’s desert cities” highlights the abundance of water in the photograph as a sign of wasteful disregard for the scarcity of water in the context of drought.

In order to provide more context, thanks to the location data embedded in the Instagram post, we can take a look at the situation of this housing development in the larger environment of La Quinta, CA.



Figure 5.9. Google Maps screenshot showing the approximate area (in red) where the photo in Figure 7 was taken.

In fact, this location where luxury living has developed despite an arid climate, and continues to thrive despite a prolonged drought, was the subject of in-depth photojournalistic work by Damon Winter, a *New York Times* photographer. His photo, featured on the front page of the April 5, 2015 edition, was taken in Palm Springs, just like this Instagram photo. It is impossible to speculate whether *The New York Times* photograph influenced this user or his/her awareness of the relationship between this housing estate and climate change, but it is an interesting coincidence nonetheless. In fact, the two photos complement each other: one showing a bird's eye view of the improbably luxurious human settlement in the desert and the other

presenting that same place from inside, in the gaze of someone who was there on the ground. However, a distinction must be made in that the professional photo appears to be more efficient: it exactly underlines and matches the headline (California Image versus Dry Reality). In social semiotic terms, according to Harrison (2003:57), what is on the left side of the image corresponds to the familiar, while the right side is “new” – a problem or issue. Thus, the image along with the headline causes readers to question their assumptions: the familiar (California as a place of high living standards) image is contrasted by the problematic dry reality (the desertification of California). The Instagram image, on the other hand, with the dry mountains in the background, is not as obvious in showing the paradox at hand.



Figure 5.10. Page A1 of The New York Times, April 5, 2015.

Impacts



Figure 5.11. Image posted October 29, 2015. Location: Folsom, CA.

This image was presumably taken at Folsom Lake, if one is to trust the hashtag #folsom. At the time of posting, Folsom Lake was at 30 percent of its historical average capacity. To put the water level into perspective, Figure 11 is a chart plotting the water levels in Folsom Lake reservoir in the 2015-2016 water season.

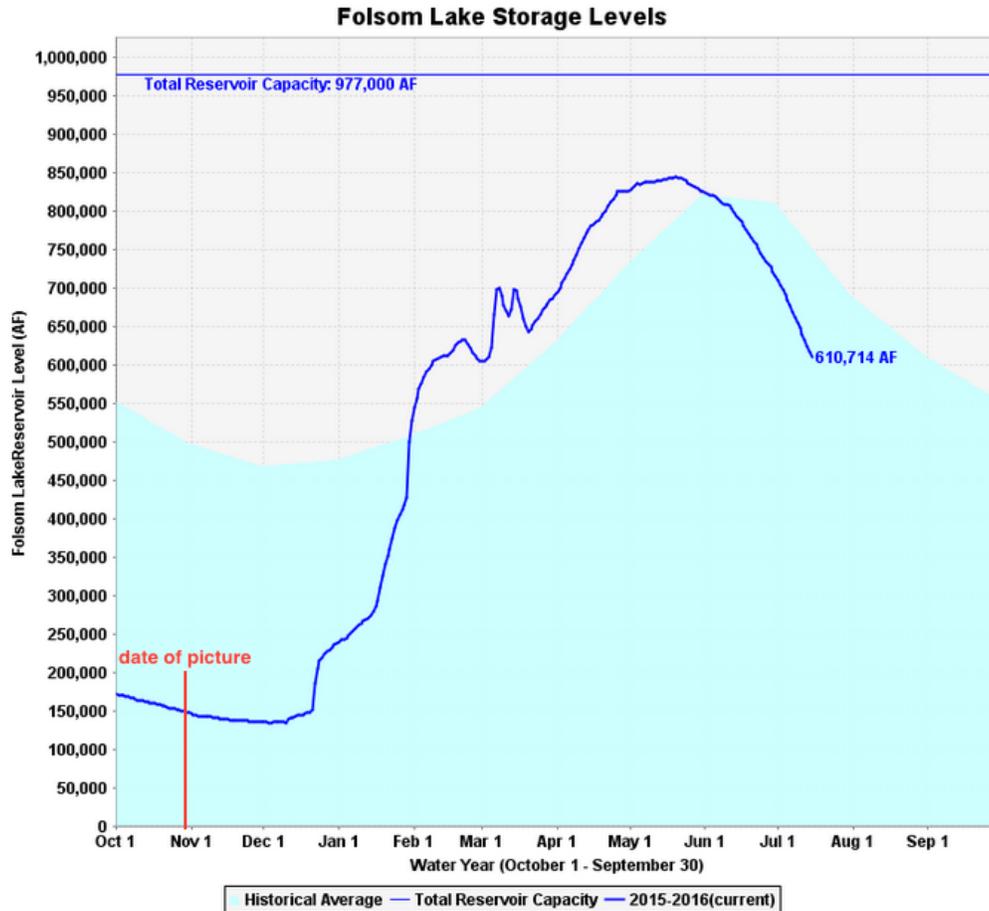


Figure 5.12. Folsom Lake water level in the 2015-2016 water season. Chart generated July 16, 2016 using the Department of Water Resources' California Data Exchange Center.

Here, as in many of the surveyed photos, the presence of humans is merely implied through landscaping or objects left behind. In this case, a loading dock is pictured in the center of the picture. In visual social semiotics, the information value of objects placed in the bottom half of an image differs from that of objects placed in the top half, in that the top signifies an “ideal” as opposed to the bottom’s “real” (Jewitt and Oyama, 2001: 148). In this case, we can see that the top contains the instantly recognizable deep blue of water, yet the bottom refers to the real situation – there is no water where there should be. The caption reinforces the feeling of lack and

emptiness, using the word “empty” and underlining it with the ironic “I’d say yeah.” as well as the hashtag #dry.



Figure 5.13. This image was uploaded on February 9, 2016. Location: Los Angeles, CA.

This image shows a person most likely looking squarely into the camera lens, though this isn’t certain because of the sunglasses obscuring her eyes. As a reminder, only a minority of the images in the dataset feature a human figure. The person is a young woman perhaps in her late twenties, dressed in summer attire, including a tank top or bathing suit and sunglasses. There is a drink in the foreground and a palm tree in the background, which create associations with beach-like weather. The caption underlines the fact that it is hot, even specifying the temperature: “88 degrees.” Average February temperatures in Los Angeles county vary from 50 to 70 degrees Fahrenheit. According to Accuweather, on February 9, 2016, the high was 89 degrees, whereas the historic average high for that day was 68 degrees. Therefore, the

image can be straightforwardly interpreted as a person witnessing to the unseasonably high temperature she is experiencing. With regard to the interactive metafunction, this image is particularly interesting: the woman is not just lightly dressed, she is adorned with a necklace, as well as sunglasses which can be called “fancy” because of their elaborate frames. She also makes a specific expression through her puckered lips – hovering between a flirtatious kiss shape and an expression of doubt. The image is clearly a selfie (the caption includes the hashtag #selfie), taken at arm’s length, showing only head and shoulders, which implies a close personal distance with the viewer, as if one was having a video chat with the picture-taker (Harrison 2003: 53). Her eyes are obscured by the sunglasses, and the viewer sees the subject and author from a low angle, which implies that the subject has some degree of power over the viewer. Interestingly, the comments reveal something of a double function in the photo: while on the surface, the photo seems to be a testimony to the unusually high temperature, in actuality it is an occasion to show oneself wearing light clothing and looking (not just feeling) “hot.” Indeed, in many similar cases in the dataset, where users post pictures of themselves suffering in the unexpected heat, a substantial majority of comments refer back not to the heat but to the attractive physical attributes of the subject-author – in essence, praising his or her looks.



Figure 5.14. Similar images in the dataset.



Figure 5.15. This image was posted on August 24, 2015. Location: Bay Area.

This image ostensibly presents three carrots on a white plate set on a wooden table. The artificial lighting used, manifested in the light reflections on the plate, indicates the setting as an indoor dining room. On a connotative level, the image is highly symbolic of the drought (misspelled in the caption and hashtag as #draught), because the carrots are evidently very small compared to standard sized carrots one would expect to see. As a representation, this image uses a conceptual narrative: there is no action in the photo, but simply an object placed there for the viewer to contemplate. It is worth noting that the image was posted at the very end of the carrot harvesting season (which lasts from November to August) and also that California accounts for a staggering 83 percent of all carrots produced in the US. As for the compositional metafunction, the image is remarkably simple, in that the withered

carrots constitute the main, central and only salient element of the picture, only made more important by the circular frame of the plate.



Figure 5.16. Image posted on November 11, 2015. Location: Big Sur, California.

This image is an outlier among the images of impacts. In many ways, it is similar to most of them (showing brown vegetation because of the drought), but in two important ways, it is different. Firstly, it is one of only several “before and after” images in the dataset. Secondly, it is the only image where the change in the landscape is coupled with a change in the author-subject’s appearance. Many images in the dataset can be considered “selfies”, but few contain significant content besides the person’s face. As Koliska & Roberts (2015: 1675) point out, “selfies can be understood as journalism with a point-of-view, combining self-presentation and the presentation of visual proof of a witnessed event.” From the point of view of the interpersonal metafunction, this post is particularly interesting. The subject is relaxed

and smiling, hands in his pockets emphasizing his relaxed pose, his gaze (in the “after” picture) directly addressing the viewer – what in social semiotic terms is termed “demand” (as opposed to “offer” where the subject would be looking at something or someone else in or outside of the image). This kind of image, where the gaze of the subject and the gaze of the viewer meet leads to higher engagement, according to Kress & van Leeuwen (1996). The subject is placed at a “far personal distance” from the viewer, meaning there is opportunity for a connection, yet at the same time the viewer can see what is in the background. In terms of angle, it is a frontal horizontal angle, placing the viewer on the same level as the subject, again fostering involvement and an impression of equal power between the viewer and the subject. The compositional metafunction of the image is clearly apparent because the image itself is a collage of two: before and after images. The “before” image is placed, as per Western convention, on the left, and the “after” image is placed on the right. The man’s beard on the right-hand picture also emphasizes the idea of time having passed since the left-hand picture. In addition, each of the pictures has an internal left-right composition consisting of the man and the landscape. Because the man is in the foreground, and the landscape behind him, his figure serves both as “evidence” of his witnessing and as a marker of time passing (because of his beard growth, and the change in his baseball hat). With regard to engagement, the comments do not relate either to the backdrop or to the caption, which emphasizes the effects of drought over three years. The comments refer only to the subject himself and his physical appearance and choice of sports affiliation.

Solutions



Figure 5.17. Image posted on March 11, 2016. Location: Yosemite National Park, CA.

This image is similar to several others in the “solutions” collection. Indeed, solutions images consist in equal measure of local officials or community activists talking on the one hand, or eco-friendly consumer choices and lifestyle practices on the other. In this image, we see two men and two women holding a meeting in a conference room at the Yosemite Valley Lodge, one person looking directly at the camera and three others engaged in various levels of thought and/or discussion. Importantly, the person looking at the camera is not the author of the post. Since the author has taken the photo presumably from his seat at the same table, the viewer feels very much “included” in the picture. In addition, the second person from the left is engaging in a “demand” relationship with the viewer by looking straight into the camera, while the other three are looking away, focusing on themselves or objects in front of them. The visual structure here is a narrative one, and the image does not seem to be consciously composed according to left-right or top-bottom, it is tilted and

the sharpness is lacking. A striking feature of the image is the preponderance of wood – the door, the table and the wall paneling are both made of wood and the large photograph of “living” woods on the wall further reinforces the connection with the forest and natural resources. In addition, all the participants in the meeting are wearing casual clothes. These two elements together – their choice of location for a meeting and their choice of dress code – convey the way they want to be seen: working for nature and distant from a corporate or official identity, though no less serious in their work. Indeed, this is highlighted in the caption which emphasizes the group is working for a more “sustainable future.” The very definition of sustainability implies the use of natural resources in such a way that they would still be available for future generations to use – and the image shows both the resources used (made into a table and wall panels) and preserved for the future (as trees standing in the forest). The frontal angle and the far personal distance (people shown from the waist up), in addition to the one person’s gaze meeting that of the viewer, makes this photo engage the viewer as an equal invited into the picture (as if to take the seat of the person holding the camera).

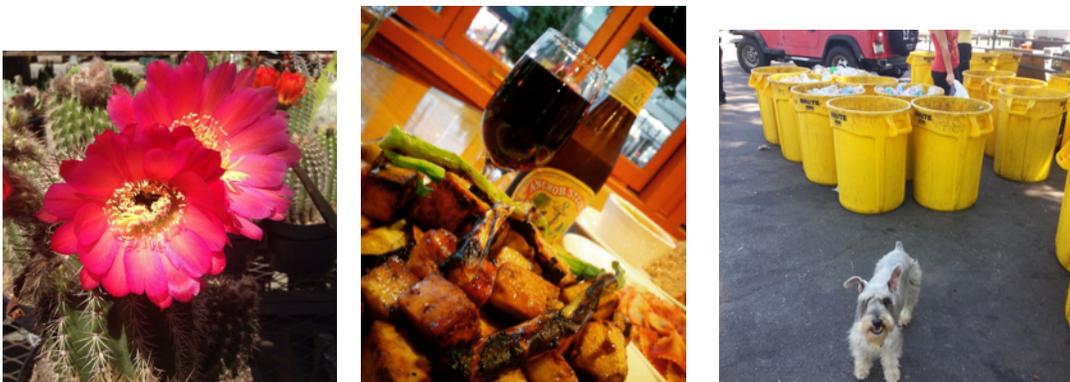


Figure 5.18. Other common “solutions” images in the dataset include shots of recycling efforts (R), dietary choices (middle) and drought-proof garden features (L).

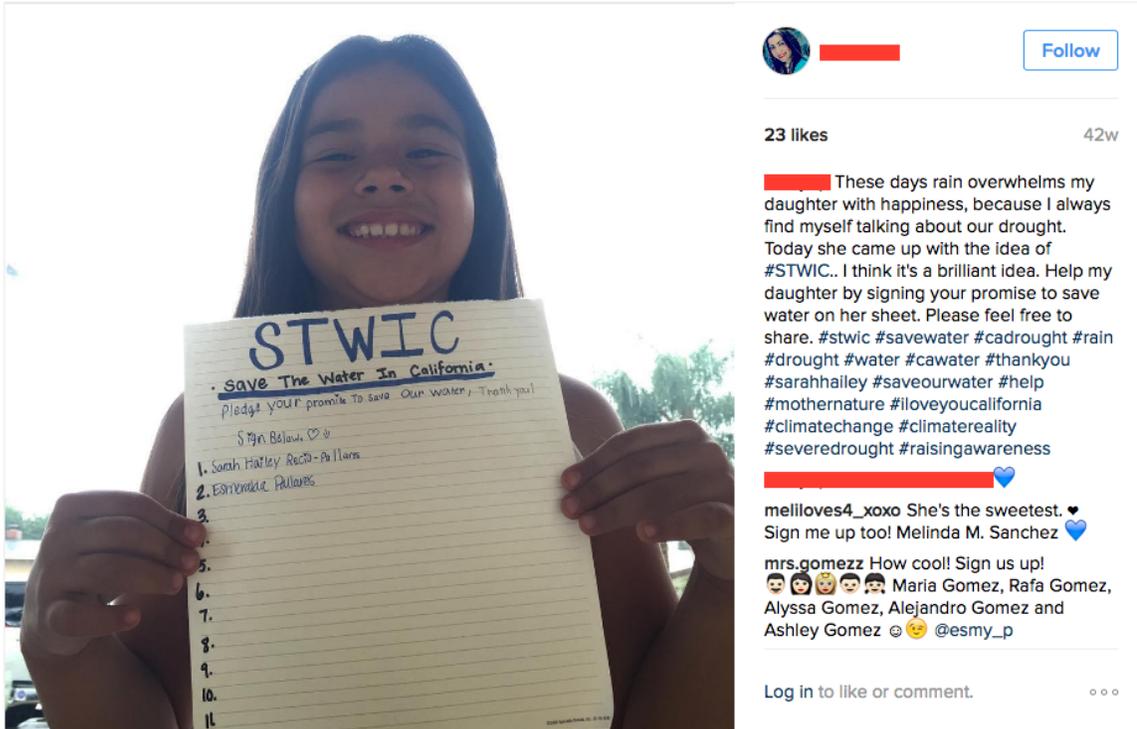


Figure 5.19. Date: September 15, 2015. Location: Los Angeles, CA.

This image is one of a kind in the entire data set. On a representational level, it shows a young girl proudly looking into the camera, showing a self-made sign-up sheet for an initiative she called “STWIC-Save the Water in California” with a big smile on her face. The image is posted by her mother, which is clear from the caption. The rest of this user’s feed is based on family life and contains mostly pictures of food, parties, and selfies with her and other family members. This image stands out in her feed as one of the only environmentally-oriented ones, which makes it all the more interesting for the purposes of this study. On the interactive plane, the image presents a strong “demand” from the child toward the viewer – not only in the strict social semiotic sense of her gaze meeting the viewer’s, but also literally a demand for signatures that is signified by her empty sign-up sheet. In terms of composition, the girl and her sheet are placed right in the middle, on a nearly white background,

making them stand out with maximum salience. Notably, the image is shot from a low angle, giving the person in it more power as compared to the viewer (she is looking down toward us). The caption emphasizes the role of the author, invisible in the photo: the girl's mother. Thus, on the interpersonal level there are several relationships at work here: first, the direct gaze of the subject asking the viewer to participate in a specific action, and secondly the relationship between picture taker and subject, which is that of a mother and daughter (this is made clear through the caption). Because the viewer knows who is posting the picture, and can relate to the emotions of the parent who is proud of her child for engaging in an act of environmental and civic awareness, the probability that the viewer would add his or her name to the list is even higher. Indeed, even in the case that the viewer does not care about water shortages, she or he may be compelled to join the cause as a result of sympathy for the mother and/or encouragement for her young daughter. In fact, this image generated one of the highest rates of engagement as measured by number and content of comments. All four of the comments posted by other users (note: only 59 images in the dataset garnered at least four comments) are relevant to the topic: they are enthusiastic sign ups, complete with first and last names, to the cause championed by the girl.

5.5. Discussion

This content analysis of Instagram photos has been revealing in many ways. First of all, it showed the outsized importance of impacts, especially drought, in the eyes of Californians. This project did not collect photos based on the #drought hashtag, yet

46 percent of the images found contain this hashtag. Whereas many aspects of climate change are difficult to visualize, people can observe the effects of drought in empty reservoirs, noting lack of snow on their favorite slopes, or the color of the grass on a familiar hiking trail. Interestingly, although causes of climate change are also ubiquitously visible in everyday life – in anything from consuming meat to driving, flying and using high-energy appliances wastefully – these are almost invisible in the dataset. Similarly, whereas solutions are easily to depict, they are only a minority in the dataset. It is clear from the most frequently used tags that causes and solutions are almost absent (with the exception of agriculture and conservation, respectively) from the dataset, and by extension, from the semantic universe of terms related to climate change.

The content analysis of this dataset has shown that the visual vernacular of climate change in California is rather narrow, tied predominantly to observable impacts – mainly drought. Among all pictures except those in the “unrelated” category, there is a majority of images including humans or some trace of human society. Predictably, the proportion is much higher among pictures of Solutions (97 percent) and Causes (100 percent) than among pictures of Impacts (65 percent). Contrary to what might be expected, the results of the content analysis conducted here showed that engagement was not higher for pictures including humans than for pictures of impacts on the natural environment. The average number of likes was slightly lower (24.8) among pictures with humans in them than among those without (26.8). However, the average number of comments was slightly higher (1.76) for pictures with humans than those without (1.55). Nonetheless, the characteristics of

people's photos of climate change in California can help climate communicators select images both in terms of relating to their audience better as well as knowing which areas of the climate change issue remain under the radar and need to be shown to the public for increased understanding. These images show that Instagram users in California have a broad imagination in terms of what constitutes a climate solution and they are happy to share their own individual actions that they believe make a difference in this matter. These photos range from acts of recycling, saving water, and biking to eating vegetarian meals and participating in local government initiatives or other political actions. What climate communicators can learn from this is that while it remains unclear whether photos of individual actions leading to climate change would be engaging or alienating, the "people formerly known as the audience" have the ability and desire to share with their followers on social media (and potentially anyone browsing through) how their actions are helping the planet. Thus, more positive portrayals showing individuals taking responsibility for the planet's future in their daily lives, perhaps crowdsourced from people who post these photos anyway, might help broaden the frame of climate change, from a calamity that we are helpless to confront to a challenge we are taking on one home at a time. In other words, it might help to make the leap between using photography as a means of witnessing to the dramatic changes that are already under way as a result of irreversible climate change, to using it as a way of documenting the myriad ways people have begun taking a stand and engaging in action to change the course of history.

The social semiotic analysis of eight chosen images explored in depth the layers of meaning making at work in regular Instagram users' photos related to

climate change in California. What this analysis showed was the intricate connections between climate change and the way people live their everyday life: an image is rarely simply about climate change, but also carries with it messages about the author, about family, about values, and self-presentation. In subtle ways, users represent themselves as worthy of attention while at the same time drawing attention to the problem of climate change. A selfie in sweltering heat, for example, provides an opportunity to show oneself looking good in scant clothing while ostensibly pointing out the abnormal temperatures caused by climate change. Some pictures include the author in them as witness to change, in a way that validates the authenticity of the photo: thus, the man with a drying landscape behind him not only draws attention to the changes in that landscape but also confirms that it was he who saw these changes with his own eyes. In conclusion, what the social semiotic analysis revealed is the high degree to which self-promotion and self-appreciation are intertwined with a genuine concern for climate change and a witnessing behavior (Koliska & Roberts, 2015). It shows that on social media, sharing an image of climate change can mean sharing an image of oneself as witness or actor, and that even if the self is not included in the photo, it plays an important role. It also confirmed that climate change as experienced in everyday life is deeply tied to unusual weather conditions. This finding echoes what Mike Hulme observed about the cultural meaning of climate: “it is the sensory experience of weather that conditions cultural responses to this human dwelling in the atmosphere, whether these be celebratory rituals, material technologies, collective memories, social practices, and so on” (Hulme, 2015: 3). As Hulme points out, through the experience of weather abnormalities, climate change is

intruding upon everyday life and manifesting itself as a cultural event. What this implies is that visual researchers and climate change communicators alike need to broaden the frame of reference of climate change to include those areas of overlap with everyday life, cultural habits, and self-presentation.

Doherty (2014) studied the problem of what allows individuals to move from being “alarmed” about climate change to actually taking action in their personal and political choices to make a difference. In a follow-up study published in *Nature Climate Change*, Doherty established that the predictors of engagement-in-action, as measured by the action of contacting public officials, were “descriptive social norms” and “personal efficacy belief” (Doherty & Webler, 2016). In other words, the more individuals see other people taking action, the more they will be motivated to do as well. The more they believe that their action can have an impact, the more willingly they will engage. Yet, these two aspects, which could be very easily communicated through photojournalism, are almost entirely absent from the visual framing of climate change as it stands today. The one exception is Instagram, and this study revealed an interesting trend of individuals demonstrating that they are taking action to mitigate climate change – sharing this fact on social media, not because they are climate activists with the explicit aim of encouraging others to follow suit, but because it is a part of their presentation of self online. When others see that their peers, who are not lifelong activists or nature junkies, are taking action, they may be encouraged to take action too. In such a way communicators could harness individuals’ self-love in fostering a virtuous spiral of climate change mitigation: for

example, one could envisage a media outlet asking its readers to submit Instagram-like photos of what they are doing to solve the climate crisis.

While this chapter showed the way that images are used on an everyday basis by people whose explicit aim is not to communicate about climate change, it is also important to attempt an understanding of how news audiences respond to different kinds of photos. This is the object of the following chapter.

6. How do stills move us? Experimental study of differential image inputs with cause, impact and solution climate change stories

6.1. Introduction

The discussion of climate change images and their characteristics in terms of visual framing of the issue would be largely futile if the choice of image didn't matter. One might be tempted to argue that the content or quality of a photograph does not matter, as long as there is an image present to draw eyeballs into the story. If any image could do, much of the research presented here would not bear any merit nor application in the practical realm of climate communication. Therefore, despite the difficulty in conducting audience studies that provide meaningful results, and the complication arising from possible intervening variables, it is worthwhile to test whether different image attributes result in different levels of engagement with the climate change issue. This is the aim of the present chapter.

Literature suggests that, beyond the simple potential of an image to draw attention to the related news story (Garcia and Stark, 1991), the content of the image also matters, and not only for story recall. An image can help frame a story, thus influencing the way it is interpreted. Visual researchers bemoan the fact that this influence of images is not taken seriously enough in journalism scholarship (Zelizer, 2010:3) while others point out that certain messages are conveyed through images that were not intended or would not be condoned in words (Messaris & Abraham, 2001). Significant studies have been published gauging the effect of image on reader attention and comprehension. One such study, by Knobloch et al. (2003), determined

that users are more attracted to stories displayed in the vicinity of threatening imagery, as opposed to innocuous imagery. Gibson & Zillmann also conducted an experiment to determine whether there can be any “effects on issue perception of incidentally incorporated photographic images that potentially carry extra-text messages” (Gibson & Zillmann, 2000: 355). To that aim, they presented a fictitious news story to 135 college students about a new tick-borne disease disproportionately affecting children. Five different versions of the story were shown: one with no image, one with an image featuring close-up images of ticks, one with both black and white children, one with only a black child, and one with only a white child. Respondents had to answer questions about the symptoms of the tick-borne disease as well as about the populations at risk after reading the article. The results were striking. First, they confirmed that inclusion of human victims made perceptions of risk higher among readers. Second, it appears that depending on the ethnicity of the victims depicted, respondents believed that ethnic group to be more at risk, despite no such indication in the text (Gibson & Zillmann, 2000:364-365). A related finding was that threatening images (such as that of the close-up of ticks) resulted in superior information acquisition from the article text.

Gibson & Zillmann’s results confirm previous findings by Wolf & Grotta in 1985, who conducted an experiment with 95 undergraduate students to gauge their response and story comprehension after viewing three different versions of a front page. They established that story comprehension was 44 percent higher among those subjects who had been presented with a fabricated front page where the photograph corresponded to the main article, than among subjects who had read the same story

accompanied by an unrelated photograph placed on the front page.

Despite some studies on climate change image reception having been conducted using images only or images with captions (O'Neill and Nicholson-Cole, 2009; O'Neill et al., 2013, Metag et al., 2016) this experiment, following Hart & Feldman (2016), included image and text as well as other elements typical of a front-page news story: a headline, a photo, a caption, a lede paragraph, and body text (300 words). As Boomgaarden et al. (2016) point out, it is important to consider images and text together, since that is how the public usually receives a news story. Horn (1999, p. 27) calls the relation between text and image a “tight coupling” and explains: “tight coupling” means that you cannot remove the words or the images” accompanying “a piece of visual language without destroying or radically diminishing the meaning a reader can obtain from it.”

Nonetheless, it is also important to bear in mind that images and text, while taken in simultaneously, are processed differently: “Textual messages are processed serially, one verbal unit at a time, while visual information is processed immediately and holistically, through the same route that emotions travel. Visuals thus tend to generate immediate emotional responses” (Boomgaarden et al., 2016: 2532). Boomgaarden et al. (2016: 2540) found that with respect to political candidates’ integrity assessment, visuals were as important as text in predicting reader response, even though the text dominated in competence assessments. Dahmen (2012) conducted an experimental pre-test post-test survey-based study with an additional measure brought in by eye-tracking technology during exposure to the stimulus. Her goal was to determine the influence of photographic framing on attitudes and

understanding of the stem cell research debate. The post-test survey showed no significant influence of the photographic frame on attitude or understanding: “changing the associated news photograph did not have an effect on what participants deemed the leading issue in the stem cell research debate” (Dahmen, 2012: 199). However, the eye-tracking data did show that participants’ attention in terms of time varied significantly by experimental frame. In particular, Dahmen found that an “emotionally laden photo of a wheelchair-bound individual garnered more visual attention than a politically based photo of a politician signing a piece of paper,” which “reinforces the findings of previous visual communication scholars who have repeatedly demonstrated the emotional power of photos” (Dahmen, 2012: 200).

Similar findings of the importance of images, especially in shaping emotional response to a news item, were made by Arpan et al. (2006) and Zillmann, Knobloch and Yu (2001). Researchers have thus argued for a second-level agenda setting effect of images (McCombs 2005; Coleman and Banning, 2006), implying that images have the potential to frame a story in a certain way, potentially influencing readers’ interpretation of the news. As Coleman explains, the “evidence of the power of images, combined with viewers’ lack of awareness of that power, makes the framing of images even more important to understand” (Coleman, 2010: 243). Images are thought to play an integral role in news framing, though the ways they do so are less clearly articulate than is the case with verbal messages (Messaris and Abraham, 2001; Rodriguez and Dimitrova, 2011).

Visual framing effects in climate change communication have been studied by O’Neill et al. (2013) and O’Neill & Nicholson-Cole (2009), who applied Q

methodology (see footnote 19 in Chapter 4) to gauge audience response to a set of 40 images representing the main types of images used in American press coverage of climate change. The researchers were interested in gauging how the pictures would rank in terms of raising respondents' issue salience and self-efficacy. To that end, they asked respondents to sort the images according to two conditional instructions. The first measured whether a photo made the climate change issue more personally important (salience) and the second, whether it made the respondent feel empowered to do something about it (self-efficacy). The researchers found that while some images of climate change impacts, like an aerial view of a local flood, did heighten salience, those very same images tended to decrease self-efficacy (O'Neill et al. 2013: 419). At the same time, they found that images of renewable energy futures increased feelings of self-efficacy. Hart & Feldman (2016) confirmed the latter finding about pictures of energy futures.

Metag et al. (2016) confirmed both findings in the context of several non-English speaking European countries, suggesting that "climate change imagery (...) is perceived in similar ways cross-culturally, transcending geographical and linguistic boundaries" (Metag et al., 2016: 220). In other words, it is plausible that audiences in different cultural contexts react similarly to climate change related photographs. Thus, the fact that the present study only includes residents of the United States does not necessarily imply that it cannot predict how people in other countries would react.

The results of the previous image effects studies cited here clearly indicate that photographs do matter in determining news audience response to the attached story. Since it is not possible in this chapter, because of material and time constraints,

to study numerous variations of image and text, the image aspect will be switched, while text will be kept constant. Previous literature as well as research conducted in this dissertation, including the interviews with photo editors (Chapter 4) and the analysis of images shared on Instagram (Chapter 5) show that photos including people can trigger a deeper engagement. The scope of this study is too narrow to allow for testing of other image attributes, such as showing individual household contributions to greenhouse gas emissions or adding images of potential solutions to stories about impacts in the vein of “constructive journalism” as defined by Haagerup (2015). However, this experiment focuses on the verification of several key elements of potentially more engaging photos: does showing the guilty actor rather than abstract systematic problems help? Does the presence of an identifiable human figure in the photo make it more engaging? Are readers emboldened to take action in their own lives when presented with a solution rather than yet another proof of something going wrong?

Hypotheses

The main goal of this experiment was to determine whether there would be a statistically significant difference in the reception of the news stories based on the photo used. The photo hypothesized as less engaging is labeled photo A in each case, and the one expected to garner higher engagement is labeled B. The null hypothesis being that there is no effect whatsoever of the choice of image upon story response, the alternative hypothesis was thus formulated as follows:

H1_a: There will be a statistically significant difference between the means of story response scores between the groups; the mean score will be higher for those who saw the B photo.

A corollary alternative hypothesis posits that all the A photos will receive statistically significant lower scores than all the B scores put together.

H2_a: The mean combined score of all the B photos will be higher than that of all the A photos, regardless of story, in a statistically significant way.

In the follow-up survey, participants were shown the photo they had not seen during the initial survey. They were then asked several questions about which photo they would have chosen to publish and why. Among other questions, respondents were asked to describe what struck them the most about the two photos and how the photos related to the message in the article. This human subjects research was approved by the University of Maryland Institutional Review Board (decision letter August 26, 2016; amended application approval December 12, 2016). This qualitative stage of the experimental study was implemented in order to provide more depth and understanding of the reasoning individual respondents apply to their reading of the respective photographs. It is in keeping with other similar audience studies that focused on administering surveys and followed up with focus groups or interviews with some or all of the participants (O'Neill & Nicholson-Cole, 2009; Corner & Randall, 2011).

6.2. Method

Experimental 2x3 survey

In this experiment, an online survey was conducted to evaluate whether the inclusion of different photos with the same story altered the way readers recall the story and interpret the information included therein. The study, similarly to Hart & Feldman

(2016: 425), follows a 2x3 experimental design with six framing conditions: the first frame was the type of photo (standard or highly engaging) and the second frame was the aspect of climate change (cause, impact, or solution).

	Photo A	Photo B
Cause	28	30
Impact	25	34
Solution	21	23

Table 6.1. Random assignment of respondents to each of the six experimental conditions.

Potential respondents were recruited via university email lists, on a website designed for academic researchers looking for study participants⁵², and through social media. The only criteria were residency in the United States and a minimum age of 18, but the sample should be considered a convenience sample considering the distribution methods, mostly revolving around large American university communities. The questions asked in the survey were as simple as possible, so as not to draw attention to the fact that the photograph was the key element under study. Survey questions are included in Appendix C. Each answer could be converted into a binary yes/no, or 0/1 response. The questions and measurements loosely followed a previous similar study conducted by Hart & Feldman (2016), where respondents answered questions about issue importance, self-efficacy, and behavioral intentions after viewing a manipulated news story with one of four randomly assigned image inputs attached to it. For each response, a news story engagement score (from 0 to 5) was computed based on five elements measuring story response:

1. Did respondent accurately recall what the story was about? (0 or 1)
2. Did the photo stand out to respondent? (0 or 1)

⁵² callforparticipants.com

3. Did respondent remember photo content (0 or 1)?
4. Did article make respondent more concerned about climate change? (0 or 1)
5. Did article make respondent want to do more about climate change? (0 or 1)

The choice of these five elements requires some explanation. The first element assesses whether the respondent gained a good grasp of the main message of the story as a whole, which corresponds to the cognitive dimension of climate change engagement. For each of the three stories, several key elements were required to be included in the respondents' answer in order to attribute 1 point in this category. For example, in the Cause story, the respondent had to include the following elements to receive one point: that the article was about Exxon-Mobil, that Exxon-Mobil was deceiving the public about climate change, and that the company is now under investigation. The second and third items of the score take the photo itself into account: the second element asking whether the respondent specifically mentioned the photo as striking. The reason for including the second item is based on research that shows that long after some individuals have forgotten the text of a story, they remember the visual that was attached to it – this is often termed the picture superiority effect (Coleman, 2010; see also Paivio et al., 1968). Therefore, the assumption made in including this element is that if the image stands out to readers, the story as a whole will be lodged in their memories for a longer time. The third item gauges whether the respondent correctly answered the question “What did the photograph show?” Here again, basic key elements of each photo needed to be mentioned for the respondent to gain one point. For example, in the impact A photo (see below), the respondent had to recall that the photo showed a forest cleared for the

purposes of meat production. Finally, the last two elements (4 and 5) are measures of the two most often studied dimensions of climate change engagement: the perception of issue importance (salience) and the intention of behavior adjustment, or readiness to act (O'Neill et al., 2013; Metag et al., 2016). It is important to note that the measurement indicators are balanced so that if they may appear skewed to favor a “1” answer for a certain image, that same image would more likely lead to a “0” answer in a different question, equalizing the effect. A case in point is picture 3B versus 3A: it is more likely that a respondent will feel “more concerned” after viewing photograph 3A, because it shows a negative effect of meat consumption on the environment. Yet it is more likely in photo 3B that the respondent would feel motivated to act, following the extended parallel processing model – if provided a positive example of action that can be taken (like eating gourmet vegan food), the likelihood of behavior change is higher. Thus, the overall scoring scheme does not favor one photograph over the other.

The sample

Two hundred and sixty-eight individuals took the survey and were randomly assigned by the Qualtrics software to one of the six experimental conditions. However, considering the complexity of the survey input and questions, all incomplete surveys, and those filled out in a time shorter than 5 minutes were disqualified. In addition, some surveys were filled out from overseas, and some by minors – these also had to be eliminated in order to preserve the integrity of the results. This left only 161 usable responses. This means that there were on average 25 respondents in each of the six experimental conditions (see Table 1 above). The

activities. In addition, 90 percent of respondents were pessimistic about the possibility of successful mitigation of climate change, answering that although humans could reduce global warming, it is either unclear whether they will do so (62 percent) or it will not happen, because humans are unwilling to act (28 percent). Most respondents (72 percent) reported having taken personal action to reduce their carbon footprint, but only 44 percent of respondents reported having taken political or civic action such as writing their representative, signing a petition, participating in a protest, etc. Despite the fact that this sample is composed mostly of people who are already highly engaged with climate change, conducting an experiment is worthwhile, as any variation in response it will show will be all the more robust an indication of the influence of images. In other words, if a person is already well informed and highly concerned by climate change, and replies “Yes” to the question about whether the image made them even more concerned, the effect of the image is that much stronger, since the room for maneuver is likely to be very small. Table 3 below shows how the sample compares with a 2016 sweeping overview survey of American’s attitudes toward climate change conducted by Pew Research Center using a nationally representative panel of 1,534 people. It clearly shows that the sample is composed of people who are more concerned about climate change, and aware of its human causes, than the average citizen.

	Sample	US adult population
Climate change is happening.	98 percent	80 percent
Climate change is caused by human activities.	84 percent	48 percent
Climate change is very or extremely important to me.	63 percent	36 percent
I have taken personal action to reduce my carbon footprint.	72 percent	20 percent all of the time, 63 percent some of the time
I have taken political/citizen action to help fight climate change.	44 percent	No data

Table 6.3. Sample attitudes toward climate change compared with national attitudes (Source for national attitudes: Pew Research Center, 2016)

Follow-up qualitative survey

A follow-up survey was sent to a subset of participants (n=70) who indicated that they agreed to be contacted for more questions at the conclusion of the initial, experimental survey. In this survey, the goal of the study was revealed: respondents were aware that they are asked to evaluate the impact that one photo has on their reception of the story as compared to the other photo. They were shown the alternative photo to the one they had seen in the experiment phase, and they were asked to decide which one is (a) more interesting, (b), more informative, (c) fits the story better, (d) is more beautiful, and finally, (e) which one they would choose to publish if they were the photo editor. The survey was brief, taking 5 minutes at most, and included both multiple choice questions, to allow comparisons and aggregate findings, as well as open-ended short text questions. The full list of questions can be found in Appendix D. A total of 29 individuals filled out the second survey; 7 had read the causes story, 13 read the impact story, and 9 the solutions story.

The stimuli

Three stories, one dealing with causes of climate change, one with impacts, and one with possible solutions, each had two possible photos. The stories were

factual, compiled from mainstream news sources such as the Associated Press and *The New York Times*, dealt with major aspects of climate change, and were about 300 words long, cut off mid-sentence, as is the custom with front page stories. The captions were adapted but described the photos in a neutral and accurate manner, and the photos were credited to their rightful copyright holders. Each story was accompanied by one of two possible photos: one photo was a long-shot, sweeping view of the situation, whereas the alternative photo contained at least one identifiable human face.

Category	Headline	ID	Photo caption
Cause	Exxon Mobil under investigation for misinforming the public about climate change risks	1A	An aerial view of the Exxon Mobil refinery in Torrance, CA.
		1B	Rex Tillerson, CEO of Exxon Mobil, at a press conference in 2008.
Impact	Climate change leads to intensification of extreme weather events, study finds	2A	A man walks through floodwaters in Hoboken, New Jersey, US on Tuesday, October 30, 2012.
		2B	A man and a woman carry their dogs to safety through the flood waters in Hoboken, New Jersey.
Solution	Going vegetarian to fight climate change?	3A	An area of the Amazon rainforest inside the Jamanxim National Forest was burned in 2014 to clear land for cattle.
		3B	Chef Anna Harouvis supervises her cooks' entrees for a traditional Greek meal made using plant based ingredients.

Table 6.2. Experimental conditions detailed

The details about the stories and photos presented to respondents are expanded below. There was one story about climate change causes (fossil fuel company deceiving the public), one about climate change impacts (extreme weather events in the US), and one about climate change solutions (going vegetarian).

Cause

Year News is Served

The Daily Surveyor

Premier Edition
Locations: Under reports a line of
signature clouds, High 12, low 10,
medium over their clouds, High 10,
low 8, tomorrow, High 10, low 8.

VOL. IX, No. 45 MONDAY, September 5th, 2016 www.thedailysurveyor.com \$2.50

Exxon Mobil under investigation for misinforming the public about climate change risks



An aerial view of the Exxon Mobil refinery in Torrance, CA. (MICHAEL LIGHT)

The New York attorney general is investigating whether ExxonMobil misled the public and investors about the dangers and potential business risks of climate change.

J.B. SMITH
WASHINGTON, D.C.

Attorney General Eric T. Schneiderman's office confirmed Friday that an investigation has been launched into Exxon Mobil. Schneiderman issued a subpoena on Wednesday, seeking financial records, emails and other documents. The investigation focuses on whether Exxon Mobil intentionally clouded public debate about science and hid from investors the risks that climate change could

pose to its business, according to a person familiar with the matter.

Exxon employed scientists who researched climate change and shared that information with company executives as early as the 1970s, according to reports from InsideClimate News and the Los Angeles Times earlier this fall. The company subsequently spent millions on campaigns to question the science behind global warming, according to the reports.

One of the scientists whose work was funded in part by Exxon is Dr. Wei-Hock Soon of the Harvard-Smithsonian Center for Astrophysics. Dr. Soon had failed, in a string of scientific papers, to disclose his funding from a coal-burning utility and other fossil-fuel interests, from which he has received at least \$1.2 million over the past decade. Dr. Soon said in his statement

that he had "always complied with what I understood to be disclosure practices in my field generally."

Environmental advocates hailed the investigations as a major victory. For more than a decade, environmental organizations have been probing alleged links between Exxon Mobil, the world's largest publicly traded energy company, and the raising of public doubt about climate change. They cited not only direct statements and advertisements by Exxon Mobil, but also alleged past support for think tanks and advocacy groups that express skepticism about climate change. Leslie Garfield, a law professor at Pace University, says other states could join New York in seeking broad settlements similar to those

Continued on page A14

Year News is Served

The Daily Surveyor

Premier Edition
Locations: Under reports a line of
signature clouds, High 12, low 10,
medium over their clouds, High 10,
low 8, tomorrow, High 10, low 8.

VOL. IX, No. 45 MONDAY, September 5th, 2016 www.thedailysurveyor.com \$2.50

Exxon Mobil under investigation for misinforming the public about climate change risks



Rex Tillerson, CEO of Exxon Mobil, at a press conference in 2008. (BRIAN HARNDON/GETTY)

The New York attorney general is investigating whether ExxonMobil misled the public and investors about the dangers and potential business risks of climate change.

J.B. SMITH
WASHINGTON, D.C.

Attorney General Eric T. Schneiderman's office confirmed Friday that an investigation has been launched into Exxon Mobil. Schneiderman issued a subpoena on Wednesday, seeking financial records, emails and other documents. The investigation focuses on whether Exxon Mobil intentionally clouded public debate about science and hid from investors the risks that climate change could

pose to its business, according to a person familiar with the matter.

Exxon employed scientists who researched climate change and shared that information with company executives as early as the 1970s, according to reports from InsideClimate News and the Los Angeles Times earlier this fall. The company subsequently spent millions on campaigns to question the science behind global warming, according to the reports.

One of the scientists whose work was funded in part by Exxon is Dr. Wei-Hock Soon of the Harvard-Smithsonian Center for Astrophysics. Dr. Soon had failed, in a string of scientific papers, to disclose his funding from a coal-burning utility and other fossil-fuel interests, from which he has received at least \$1.2 million over the past decade. Dr. Soon said in his statement

that he had "always complied with what I understood to be disclosure practices in my field generally."

Environmental advocates hailed the investigations as a major victory. For more than a decade, environmental organizations have been probing alleged links between Exxon Mobil, the world's largest publicly traded energy company, and the raising of public doubt about climate change. They cited not only direct statements and advertisements by Exxon Mobil, but also alleged past support for think tanks and advocacy groups that express skepticism about climate change. Leslie Garfield, a law professor at Pace University, says other states could join New York in seeking broad settlements similar to those

Continued on page A14

Figure 6.1. The A and B story presentations in the Cause category.

The "Cause" story was a composite of multiple actual news stories about Exxon Mobil's alleged deception of the public with regard to what they knew about climate change. The A photo showed a bird's eye view of a now-closed Torrance, CA oil refinery belonging to Exxon Mobil. The B photo showed the Exxon CEO, Rex Tillerson, hearing questions at one of his press conferences in 2008. The article segment featured did not mention the CEO. The inclusion of the CEO in the experimental article version was aimed to measure whether readers respond differently to the accusations against Exxon when they can see the face of one of the people responsible for the alleged deception, rather than an impersonal image of a sprawling refinery. One of the main reasons for including the photo of the Exxon

CEO is that this experimental condition can address a gap in the literature on climate change news photography: no research has been done measuring the response to photographs of bad actors in the climate change phenomenon, that is, individuals who have deliberately undertaken actions to impede the reduction of greenhouse gas emissions. Tillerson has been actively resisting any attempts to compel Exxon to adjust its business in accordance with the risk of climate change as late as 2016, even though he publicly acknowledged the link between greenhouse gas emissions and climate change in 2006 when he took over as CEO. Yet, in 2016 *The Guardian* quoted him as saying: “The world is going to have to continue using fossil fuels, whether they like it or not”⁵³ and he recommended against a 2016 shareholder resolution spearheaded by Sister Patricia Daly to acknowledge the “moral imperative” of action to maintain warming below 2 degrees Celsius.⁵⁴ None of these facts about Tillerson were detailed in the story presented to readers, yet the association between a CEO and long-term conduct of his company is clear. The Tillerson photo is distinctly focused on him, showing him against a dark background where the Exxon logo is displayed in red letters, with strong vignetting on the photo and from a low angle. His gaze is averted from the camera and his lips are curved downward in a weary frown. Boomgaarden et al. (2016) note that in the case of news reports on political candidates, images can have a decisive impact on whether the candidate is viewed favorably or unfavorably. In perhaps one of the closest achievements to a clear-cut determination of image effects, Coleman and Wu (2015:99-102) compared

⁵³ Neate, Rupert. “ExxonMobil CEO: ending oil production ‘not acceptable for humanity’.” *The Guardian*, May 25, 2016.

⁵⁴ Cronin, Melissa. „Meet the nun trying to reform Exxon Mobil”, *Grist*, May 26, 2016.

presidential candidate images in the 2000 election to favorability ratings from the National Election Survey in that year. They found that visual bias indeed plays a role in determining how the public perceives candidates, with voters' affective attitudes towards the main candidates closely mirroring the media portrayals. Unfortunately, some respondents were still taking the survey at the moment when Tillerson was announced as President-Elect Donald Trump's pick for Secretary of State. These responses were excluded from the results, as Tillerson's sudden prominence in the news could have skewed the results. In retrospect, it would have been more helpful to select a photo of the Exxon-sponsored scientist, Dr. Wei-Hock Soon, but no high quality photos of him were found.

Impact

Your News is Served

The Daily Surveyor

Vol. IX, No. 45 MONDAY, September 21st, 2016 www.thedailysurveyor.com \$2.50

Climate change leads to intensification of extreme weather events, study finds



EMILE VANMETER/BLOOMBERG

A man walks through flood waters in Hoboken, New Jersey, U.S., on Tuesday, Oct. 20, 2012.

Climate scientists established a firm link between CO2 emissions, warming of ocean waters, and intensification of extreme weather.

J.R. SMITH
WASHINGTON, D.C.

Why was hurricane Sandy so damaging? Hurricane Sandy got large because it wandered north along the U.S. coast, where ocean water is still warm this time of year, pumping energy into the swirling system. But it got even larger when a cold Jet Stream made a sharp dip southward from Canada down into the eastern U.S. The cold air, positioned against warm Atlantic air, added energy to the atmosphere and therefore to Sandy, just as it moved into that region, expanding the storm even further.

The atmospheric pattern that sent the Jet Stream south is colloquially known as a "blocking high"—a big pressure center stuck over the very northern Atlantic Ocean and southern Arctic Ocean. And what led to that? A climate phenomenon called the North Atlantic Oscillation (NAO)—essentially, the state of atmospheric pressure in that region. This state can be positive or negative, and it had changed from positive to negative two weeks before Sandy arrived. The climate kicker? Recent research by Charles Greene at Cornell University and other climate scientists has shown that as more Arctic sea ice melts in the summer—because of global warming—the NAO is more likely to be negative during the autumn and winter. A negative NAO makes the Jet Stream more likely to move in a big, wavy pattern across the U.S., Canada and the Atlantic, causing the kind of big southward dip that occurred during Sandy.

Climate change amps up other basic factors that contribute to big storms. For example, the oceans have warmed, providing more energy for storms. And the Earth's atmosphere has warmed, so it retains more moisture, which is drawn into storms and is then dumped on us.

Continued on page A14

Your News is Served

The Daily Surveyor

Vol. IX, No. 45 MONDAY, September 21st, 2016 www.thedailysurveyor.com \$2.50

Climate change leads to intensification of extreme weather events, study finds



ALEC C. PERKINS

A man and a woman carry their dogs to safety through the flood waters in Hoboken, New Jersey.

Climate scientists established a firm link between CO2 emissions, warming of ocean waters, and intensification of extreme weather.

J.R. SMITH
WASHINGTON, D.C.

Why was hurricane Sandy so damaging? Hurricane Sandy got large because it wandered north along the U.S. coast, where ocean water is still warm this time of year, pumping energy into the swirling system. But it got even larger when a cold Jet Stream made a sharp dip southward from Canada down into the eastern U.S. The cold air, positioned against warm Atlantic air, added energy to the atmosphere and therefore to Sandy, just as it moved into that region, expanding the storm even further.

The atmospheric pattern that sent the Jet Stream south is colloquially known as a "blocking high"—a big pressure center stuck over the very northern Atlantic Ocean and southern Arctic Ocean. And what led to that? A climate phenomenon called the North Atlantic Oscillation (NAO)—essentially, the state of atmospheric pressure in that region. This state can be positive or negative, and it had changed from positive to negative two weeks before Sandy arrived. The climate kicker? Recent research by Charles Greene at Cornell University and other climate scientists has shown that as more Arctic sea ice melts in the summer—because of global warming—the NAO is more likely to be negative during the autumn and winter. A negative NAO makes the Jet Stream more likely to move in a big, wavy pattern across the U.S., Canada and the Atlantic, causing the kind of big southward dip that occurred during Sandy.

Climate change amps up other basic factors that contribute to big storms. For example, the oceans have warmed, providing more energy for storms. And the Earth's atmosphere has warmed, so it retains more moisture, which is drawn into storms and is then dumped on us.

Continued on page A14

Figure 6.2. The A and B story presentations in the Impact category.

The impact story featured an explanation of the scientific linkages between extreme weather events such as Hurricane Sandy and climate change. Here, both the A and B photos presented a local impact (flood waters in 2012, New Jersey) with the one significant difference being that the distance between viewer and affected victim was smaller in photo 2B and the victims were facing the camera rather than looking away. In social semiotic terms, thus photo 2B is a “demand” photo leading to higher emotional involvement (Harrison, 2003; Adams & Cleck, 2005) and shows its represented persons in close social distance from the viewer. In addition, the victims in photo 2B were carrying dogs in their arms, which adds a “punctum” (Barthes, 1981) that 2A does not have. One could argue that the figure of the lonely man in the center of 2A is a key element catching the eye and centering the focus, but it does not constitute something “unexpected” or “novel” like the dogs cradled in the couple’s arms do (Mendelson, 2001).

engagement score because of the presence of humans, as is the case with the other two photos. In addition, photo 3B represents a positive view of the solution story: instead of NOT doing X (in this case eating meat), it shows the appeal of doing Y (eating vegan meals). In the Cause photo the aim was to show a bad actor, which is one of the missing frames of visual climate change communication overall, as found by Rebich-Hespanha et al. (2015). The impact photo showed a relatable victim, as opposed to the more widespread use of distant, developing country disaster images featuring victims whose daily life is far removed from Western audiences. The solution photo, in turn, portrays agents for good – people who are actively promoting a meat-free lifestyle by preparing gourmet meals without the use of animal products. In addition, the hypothesis for favoring photo 3B over 3A in this case would rest on the assumption, based on previously cited studies, that a photo showing concrete actions taken to limit carbon emissions will be more conducive to feelings of self-efficacy than a photo showing the result of unwanted action (3A), which may rather lead to feelings of defeat and being overwhelmed by the scale of the problem at hand.

6.3. Results

T-test results from experimental survey

Alternative hypothesis H1_a stated that there would be a statistically significant difference in the score means between the groups shown A or B photos respectively. The original intention was to perform independent sample t-tests, but the data did not pass a Shapiro-Wilk test for normal distribution, which was to be expected, considering the small sample size. Therefore, the Mann-Whitney U test, a non-

parametric test was employed instead. The Mann-Whitney U test is more robust than the t-test because it compares the sums of ranks, reducing the risk of a type I error. Four tests were performed. Three tests were performed to verify hypothesis H1, comparing the means of photo A and B within each story (cause, impact, and solution). The fourth test, corresponding to hypothesis H2_a, measured the difference of means between all A photos (regardless of story aspect) and all B photos (regardless of story aspect). All four tests except one proved inconclusive, prohibiting a rejection of both null hypotheses. Not only was there no statistically significant difference between the experimental conditions, but where there was a difference, it went in the direction opposite from that expected. In H1, the Mann-Whitney test in the solutions story did show a statistically significant difference ($p=0.02$) between the means of respondents shown the photo of scorched forest land ($m=2.7$, $SD=1.30$) and that showing a vegetarian cook with her apprentices at work ($m=2.0$; $SD=1.21$). However, the effect goes in the opposite direction to that hypothesized: story engagement score was higher on average (2.7 as compared to 2) for the version of the story presenting the scorched forest photo. What this suggests is that contrary to expectations, audience members are more engaged with a story about climate change solutions when they are presented with a large-scale photograph of the effect of inaction or business as usual, instead of a possibility of doing things differently, which was represented in the photo of the chef preparing gourmet food without any animal ingredients.

Several observations must be added, however, before this test is considered evidence of large-scale apocalyptic sublime shots improving story engagement

scores. Firstly, the meat-eating story was somewhat unusual compared to the other two in that nearly a third of the respondents who interacted with this story had never heard of the link between meat consumption and greenhouse gases before. This was not the case with the two other stories – much more widely circulated in the media – about fossil fuel companies making efforts to downplay the seriousness of anthropogenic climate change on the one hand, and climate change intensifying extreme weather events such as Hurricane Sandy on the other. In addition, the B photo in this case was, in retrospect, not the best choice because it was not directly congruent with the text of the article, where gourmet vegetarian cooking was not mentioned. The scorched forest picture was much more congruent with the story text, which focused on describing the impact of meat production on greenhouse gases rather than discussing alternative diets in detail. Strikingly, the most direct measure of story response, consisting of the Yes/No questions regarding whether the story made the reader feel more concerned and whether it made him or her want to do more to stop climate change, revealed that in the solutions story, the photo made a significant difference indeed. Out of 2 possible points, the score for photo A was 1.5 and for photo B only 0.85 – the difference of means being significant ($p=0.01$). This puts into question the findings arrived at by O’Neill et al. (2013), whereby images of energy futures such as solar panels and home insulation, as well as lifestyle choices such as eating less meat, are more conducive to engagement than images of traffic jams or fuel pumps.

Qualitative results from follow-up survey

The follow-up survey provides more explanations as to why the photos worked the way they did, instead of the way they were hypothesized to work. When asked which photo, A or B, they would have chosen to publish if they were the photo editor in charge, respondents hesitated and answers varied greatly. In none of the stories was photo A or photo B the decisive favorite. Table 4 summarizes some of the key quotes from respondents. One clear conclusion is that among only several dozen individuals, the reasons cited for preferring one photo over another are highly diverse: from the aesthetic appeal, to the informational value, to the expected effect of the photo on other readers. All respondents, however, underline the role of emotions in their comment, and the emotional impact of the photo is apparently an important factor in its popularity. A broad conclusion is that in those cases (more frequent) when photo A was favored, attributes such as its aesthetic clarity and general informational value were brought up. When photo B was favored, justifications were based on the concrete person or persons depicted and the way their physical presence makes the story come to life. Some respondents, in their reasoning behind choosing photo B, used the exact arguments that would follow from the research conducted elsewhere and in this thesis: for example, one person stated that the B photo in the Solutions story was better because “The second photo shows active participation in the proposed solution to the problem stated in the article.” Another argued for photo B in the Cause story because it showed a person who is responsible for wrongdoing, which is an element often lacking in climate change photojournalism. Yet another explained that photo B in the Impact story was more engaging because the inclusion of the two

flood victims faces made it possible to “feel the people’s pain.” One respondent even identified something like Barthes’ *punctum* in the Impact B photo, which he or she refers to here as “hook”: “(...) photo B has a great ‘hook’ in it’s [sic] human interest component, showing the suffering of people and their pets. If either the man or woman was carrying a young child, it would have had even a great ‘hook’.” However, on the side of the A photos were equally valid arguments, the most prominent of which was the value of seeing the problem at scale – this was especially true of the Solutions photo, where photo A depicting a swath of Amazonian rainforest cleared for grazing land was deemed “unsettling” by one respondent. Another detailed his/her reaction:

Photo A is shocking. The destruction evident in the photo makes me both sad and outraged. That is what I get from just looking at the photo. The photo makes me want to read the caption and then, reading the caption, I am appalled, utterly appalled. From that, I want to read the article. Photo B -- I don't know what they are making, or where or why. It is uninteresting. Probably it is a bunch of people in a commercial setting making cookies. Who cares about that?

In the impact photo as well, one respondent preferred the bird’s eye view A photo because “it shows the broader environment that was affected.” Another respondent, hesitating between the two photos, said A’s advantage is that it shows “the bigger picture.” This anecdotal evidence from a handful of readers confirms the surprising findings from the quantitative part of the experiment. Indeed, it is possible that engagement as merely a state of raised concern shouldn’t be altogether discounted as insufficient. It is possible that those images that show the devastating impact of human activity on the natural environment, or the breadth of impact inflicted by a natural disaster made worse as a result of climate change, are still effective in terms

of jolting viewers out of their everyday experience of comfort, orderliness and relative safety. Whether that “jolt” has any long-lasting effects in terms of attitude and behavior change can and should be verified in future longitudinal research studies.

	Favoring photo A	Favoring photo B	Ambiguous
Cause	Photo A is a very visual lead in to the story being told. The picture of the plant with the spewing of pollution into the atmosphere tells it all.	Photo A is too complicated to understand at a glance. Photo B shows the person responsible and can easily be understood quickly.	
Impact	<p>Photo A takes a more expansive look at the flooding. It is more dramatic and leaves you with an image of a very big problem.</p> <p>Because it shows the broader environment that was affected</p>	<p>Seeing the man and the girl's name make it more "real" (Photo B), like people are being affected. Photo A shows a wider view of the flood, but just the back of the person. The reader cannot feel the people's pain.</p> <p>Sometimes a photo is needed for a hook that will carry emotional weight.</p> <p>Newspapers need to sell papers, Photo B "sells itself"</p>	<p>Photo A is more informative and provides "the bigger picture", but photo B has a great "hook" in it's human interest component, showing the suffering of people and their pets. If either the man or woman was carrying a young child, it would have had even a great "hook."</p> <p>The photo should show the scale of devastation as well as some personal element. Photo B is not befitting the front page. Photo A is too devoid of any personal interest. How abt a shot of a neighborhood with toys floating past the flooded homes?</p>
Solution	<p>Photo B are just people making food. Photo A is unsettling, a picture of deforestation, destruction to the planet etc. Greater visual impact.</p> <p>Photo A is shocking. The destruction evident in the photo makes me both sad and outraged. That is what I get from just looking at the photo. The photo makes me want to read the caption and then, reading the caption, I am appalled, utterly appalled. From that, I want to read the article. Photo B -- I don't know what they are making, or where or why. It is uninteresting. Probably it is a bunch of people in a commercial setting making cookies. Who cares about that?</p> <p>Photo A made me want to know more about what I saw, such as the cause for the devastation I saw going on.</p>	<p>I feel like it's a more inviting photo. The article appeals to those who read about food in the newspaper.</p> <p>Presumably these are food-lovers, who may still be eating a significant amount of meat. The point of the article is to persuade those food lovers to decrease their meat consumption, thereby helping reduce greenhouse gasses. The photo of the chef preparing beautiful vegetarian food makes that food choice look enticing.</p> <p>The second photo shows active participation in the proposed solution to the problem stated in the article.</p>	<p>I believe the first photo is a more realistic look at the severity and the seriousness of the issue. It might not attract as many viewers, but it does seem more fitting to the topic. The second photo is more visually appealing and less alarming, but it makes the entire subject feel less important and more of a cultural curiosity, rather than as a very important and immediate step towards averting climate change disaster.</p>

Table 6.4. Relevant respondent judgments on respective value of photos A and B

6.4. Discussion

The experimental study conducted here was not intended to be representative, but rather aimed at deepening the understanding of news audiences' discursive reaction to photos depicting various aspects of climate change. Thus, while ostensibly the t-tests measure the effect of the photo, which was the only independent variable modified (along with its caption), on story reception, it is not clear that this effect would be the same if tested on a different, more diverse population. For the purposes of this dissertation, obtaining a nationally representative, large panel of respondents was not a financially viable option. In addition, the measures used in the survey were not sufficiently precise to grasp the role various aspects of the photograph (content, composition, color palette, etc.) may have played in the way respondents approached the story. In the interest of preserving respondent neutrality, respondents were not informed that they would have to focus specifically on the photograph. As a result, many did not pay any attention to it, and instead approached the task as a reading comprehension task, which was not the intention of this test. This can be explained by the fact that people are accustomed to take text into account as a more valid and authoritative input source than an image, especially in a "quiz" like setting where they anticipate being asked questions about the content. Indeed, the mean recall score for all the stories was slightly higher (0.52) than the photo recall score (0.50).

Future iterations of this experiment should include focus groups or researcher observation of individuals interacting with the story and thinking aloud as they take in the various elements of the story. Eye-tracking software could also be incorporated to measure both the amount of time spent looking at each photo and the areas of the

photo given most attention to. In an effort not to prime the respondents to be on the lookout for photo effects, the directions in this survey did not emphasize *ex ante* that the photo should be paid particular attention to. The instructions simply stated: “You are now going to read the following news story. Take your time to read the text and consider the picture and caption as well.” In retrospect, a middle ground could have been achieved by instructing respondents more clearly to weigh all elements of the news story equally and closely – for example, the instruction could have been “Please pay careful attention to the headline, lede paragraph, photo, photo caption and text when reading this story.”

In addition, respondents were not allowed to go back in the survey, which was a deliberate choice – forcing them to answer the questions about the story and the photo only based on short-term memory. An interesting and revealing finding is that some respondents reported not taking the photo into account at all (“Didn’t really pay attention, (...)”, “Not sure”, “No idea”, “Did not notice it”, “I don’t recall”).

6.5. Limitations and future variations

This experiment has several limitations. Dahmen (2012: 200) in her similar experimental study acknowledged that “different photos for each frame could have yielded different results” and in this study, similarly, each frame (cause, impact, solution) had only two possible photographs that viewers could react to. The sampling strategy in the survey was limited to social media announcements, an ad on CallForParticipants.com, and distribution on mailing lists. Although the resulting sample is diverse enough, it is skewed heavily towards women (which is an interesting finding in itself), and even though the survey was administered during five

months, it did not gather a sufficient number of usable responses. Indeed, nearly half of the responses had to be eliminated based on the fact that they were incomplete or filled out in less than five minutes. Furthermore, the survey design could have been improved by asking more specific multiple choice questions about the story and the photograph, rather than prompting text input. The story engagement score could thus be rendered more precise. However, the value of qualitative input from respondents cannot be underestimated here, as there is nothing straightforward in the way people read images, and seeing those readings articulated is beneficial to our understanding of how images function. One drawback of conducting the entire survey online rather than live is the impossibility of observing users as they contemplate the photo and the story – input from a think-aloud session would be perhaps even more beneficial than respondents' composed answers in the survey questions.

7. Conclusion

7.1 Executive Summary

In this dissertation, visual framing of climate change was examined in detail at several points of its development: from the photo editor's desk, to the audience reading of a picture within a front-page news story, to social media sharing of images. Artists, opinion leaders, activists, policymakers and journalists are grappling with the paradox of large-scale inaction on the part of citizens and governments in the face of overwhelming evidence that our planet, and therefore our civilization, is at serious risk because of our own actions. At a moment when the Anthropocene is about to be recognized as an official geological epoch, meaning that for the first time mankind's activity is so significant that it has the potential to alter the fossil record, communicating about the gravity of the problem and our responsibility in solving it is vital. In addition, efforts to understand how climate communication can improve engagement are now more necessary than ever, considering that scientists argue we may already be past the point of no return in terms of a 2 degree warming, which can potentially lead to widespread resignation and be an incentive to pursue business as usual. An unforeseen circumstance also makes the conclusions reached here ever so useful: with the election of Donald J. Trump to the presidency of the United States in 2016 - a man who claimed climate change is a "hoax" - it is unclear what the American government will continue to do in terms of climate change mitigation and fossil fuel divestment. The public is at risk of being lured away from the climate change story by quick fixes to more immediate problems such as jobs - at a moment

when the new establishment must be held accountable to respect the Paris accord and drastically reduce emissions, primarily by investing in clean energy.

The current state of visual framing of climate change

In the first chapter, I summarized relevant literature on climate communication, which paints a broad picture of the current state of both verbal and non-verbal communication of climate change. The most important takeaways from the current state of knowledge about climate change engagement is that whatever communicators are doing, it by and large isn't working. There is a large gap between what the scientific community thinks and what news audiences think, which demonstrates that journalists are failing to communicate effectively on this issue. Despite significant progress that has been achieved moving away from the information deficit model towards the new model of public engagement with science, many communicators are still struggling to find effective ways to heighten engagement with this pressing issue.

In part, the nature of the problem is to blame. Climate change is a form of “slow violence”, not often the stuff of breaking news. It thrives in the kind of detailed, thematic coverage that the current, media landscape, which caters to ever shortening attention span, decidedly does not favor (Nixon, 2011). It is an intergenerational issue with deferred benefits to action: if we do all we can to reduce greenhouse gas emissions now, we will not ourselves reap the benefits of that sacrifice. Even when high levels of concern are attained, the corresponding behavioral or political involvement is rarely observed (Doherty, 2014).

What multiple content analyses of climate change images in the news have found is that the predominant visual message readers get about climate change is that

its negative effects can already be felt and seen not only in distant, exotic places, but also right here at home. While that is progress, in a way – the closer the impact, the more relevant it is to readers – it also skews the imagination of climate change in a certain direction. It results in the presentation of climate change as a negative phenomenon (which arguably, it is) that is looming over humanity’s destiny like an asteroid about to hit Earth from space (which it isn’t). In other words, the relatively low amount of visual coverage of causes (both systemic and individual) of climate change, particularly bad actors, as well as the timid efforts to cover positive efforts at all levels to tackle climate change and work for a sustainable future, conspire to leave readers without a sense of collective responsibility for the crisis, and bereft of optimism about how to go about meeting this challenge. This narrow vision of climate change as reduced to its most dire effects can result in viewers feeling overwhelmed, despondent, and disengaged from the story altogether.

Photo Editors: the gatekeepers of climate images

At the very least, the chapter based on interviews with photo editors in California and two national papers demonstrated that this profession is a rich source of information about how audiences see what they see. The most striking feature of the interviews is, concurrent with Zelizer’s analysis (2004: 118) of the troubled rise of photojournalism into its own alongside the verbal reporting side of newspapers, that photo selection criteria are rather vaguely defined and often boil down to a gut feeling or an aesthetic sensitivity of the editor. Previous research has attempted to analyze decision-making criteria among photo editors using “photo news factors,” and found that the main elements coming into play are emotions, formal execution, celebrity, negativity, and

unexpectedness (Rössler et al., 2011: 434) – yet even these are not articulated clearly by photo editors; instead they are applied subconsciously, and in combination with other factors such as personal attitude and specific knowledge of the issue at hand. Unsurprisingly, since photojournalism seems to subscribe to its own version of the famous adage, “if it bleeds, it ledes”, the interviews revealed that photo editors do not usually think of climate causes or solutions as subjects worthy of pursuing with an in-house assigned photographer. Instead, they focus on impacts which receive the lion’s share of original coverage.

One interesting finding however, which pertains to photojournalism in all areas, is that it plays a major role in agenda setting. In other words, if high quality visuals are available for a story, sometimes even a story that was not going to have significant play can be pushed to the front thanks to the visuals. This is crucial for climate change reporting, regardless of whether the photo itself heightens engagement or not, the climate story rarely makes it to the front page because it lacks breaking news character – but a good photo could “boost” it into that prime position.

This series of interviews with photo editors reveals an important need for this profession to be aware of its value within the newsroom, which is not always recognized. Most photo editors know that they are due a key place at the table, but some do not appreciate how decisive of an influence on framing and agenda-setting the assignment and selection of rich, storytelling and engaging images may have. The interviews also revealed a disconnect between specific instances of news related to climate change and contextualizing them within the broader, thematic frame. Even if stories and photo captions do not explicitly refer to climate change every time, and

likely for a good reason, it is important for the photo editors themselves to perceive the continuity and inter-relationships between various aspects of this important phenomenon, including energy innovation, pollution regulations, consumption habits, international negotiations, and science. Furthermore, while it would be unreasonable to expect a strict codification of criteria defining a “good” climate change photograph, this analysis has shown that more self-reflection on the part of photo editors could be beneficial in providing readers with a consistently engaging visual story of climate change. Photo editors should be more cognizant of the implications various photos may carry, beyond simply searching for an “arresting” or “compelling” visual to attract the highest possible click count. For example, photo editors could reflect on the informational, journalistic value of “apocalyptic sublime” images and whether their use, while effective in heightening concern, may benefit from being accompanied by more down-to-earth, solution oriented photos. Similarly, the overbearing bias of all visual climate change reporting toward impacts results in a mental image of the phenomenon, as seen in Chapter 5, that is predominantly negative and even defeatist, presenting climate change as a *fait accompli* that can effectively not be countered. Thus, photo editors might benefit from searching for more nuanced photographic frames of climate change, perhaps even experimenting, as suggested by Rebich-Hespanha, with photographs of bad actors (climate denial funders, oil industry representatives), climate causes at individual scale, or images of inspiring climate change solutions.

Finally, photo editors must reflect on what kind of “engagement” their work is aiming for. It is not difficult to fall victim, in communicating about such a vital issue

as climate change, to a blurring of engagements: there is public engagement as the state of intellectual, emotional and behavioral connection with an issue, and there is audience engagement as the very quantitative metric of clicks, likes and comments on any given news story. Photo editors and other visual communicators must always ask themselves which kind of engagement they are striving for by choosing one photo over another. Salient, spectacular images of ice disappearing, mudslides, etc. may be good for attracting clicks and may lead to photojournalism awards for the paper's staff. Yet, sometimes, photographs that are less aesthetically pleasing, less immediately impactful or compelling, may contain information that is more suited to engage audiences with the problem (and its solutions) itself.

The apocalyptic sublime: a master trope of visual climate change rhetoric

Quite often, those images that do make it to the front page belong to the “apocalyptic sublime” trope. These images are aesthetically satisfying, grand scale illustrations of current or future impacts of climate change where the human figure either does not appear or is so minimized as to appear insignificant. Paradoxically, these images, emblematic of the Anthropocene, usually de-emphasize the value and importance of that very human being, reverting to a sublime rhetoric of 19th century landscape painting where humans felt thwarted by the awesome power of nature. Although this dissertation has described and problematized the prevalence of such images in visual climate change discourse, it cannot offer specific recommendations as to the effectiveness of such images in heightening engagement. Indeed, one such image was used in the experiment chapter and the results indicated that it was considerably more

engaging – at least in terms of raising awareness of a grave problem – than the competing photo, which was both more positive (self-efficacy), depicting something others are doing to help fight climate change (descriptive social norms), and included human figures. More systematic testing is needed to tease out the way that apocalyptic sublime images work. Perhaps a re-definition of some aspects of the apocalyptic sublime should also be considered: instead of including all images showing large scale destruction or disaster, only those images which show natural beauty under threat of disappearance could qualify. More research is needed to establish the boundaries of apocalyptic sublime images.

Instagram images reveal existing and new visual frames of climate change

The detailed analysis of 500 images posted to Instagram by regular users who were neither activists nor climate change specialists was especially revealing as it both confirmed the findings from the literature review and the photo editor interviews, and opened up a new avenue for future research and practice in visual climate communication. While here too, the majority of images represented negative consequences of climate change, members of the public offered a surprising and refreshing take on the relationship between individual self-promotion on social media and participation in collective good. Indeed, many popular photos show individuals taking on an active role in their community or personal life to do something in response to climate change. As Doherty (2014; 2016) has shown, descriptive social norms and heightened perceptions of self-efficacy are paramount when it comes to moving from a state of alarm about climate change to taking action. What better way

to communicate those aspects than by using photos of regular individuals, whose lives do not revolve around environmental activism, doing their part?

What leads to higher story understanding and engagement?

In the experimental chapter, results suggest that the use of two drastically different photographs, in two out of three cases, made no difference in engagement scores. However, as previously mentioned, a statistically significant effect was found between the photo of the scorched Amazonian rainforest and the picture of vegetarian chefs preparing gourmet Greek food. Both these photos accompanied a story about the often overlooked link between meat consumption and greenhouse gas emissions. Although the burned down rainforest picture could qualify as an apocalyptic sublime image (large scale, not showing any humans, aesthetically mesmerizing through its pattern-like form, showing ample destruction of natural landscape), it appeared to move respondents more than the other image. This result contradicts the hypotheses set out in this thesis, which implies that more research is needed specifically on apocalyptic sublime images on the one hand, and more positive, solution-oriented images on the other. The reason that broad conclusions cannot be drawn from this test alone is the following: a possible intervening variable could be the congruence of the image and the text. Indeed, photo A showed the negative effects of meat consumption, which is what the text of the article focused on. Had the text of the article focused more on benefits of moving to a vegetarian diet (and enjoying it!), perhaps the results would be different. Powell et al. (2015) conducted research that suggests a higher degree of congruence between image and text matters in story reception: “when images and text are presented together, as in a typical news report,

the frame carried by the text influences opinions regardless of the accompanying image” (Powell et al., 2015: 997). In addition, the B photo itself could have been chosen better: it had no apparent *punctum*, in Barthes’ terms.

7.2. Limitations of this research

The limitations of the projects undertaken as part of this dissertation research are discussed in each chapter. However, to reiterate, it is clear that with more resources, some of the analyses, especially the survey, could have yielded more robust results. Also, while the choice of experimental conditions was based on theoretical assumptions and previous audience research in visual climate communication, what was not taken into account is that other elements of the pictures than those for which they were chosen could have influenced reader response. In the future, more such experimental studies are called for, especially using the think aloud protocol, which allows the researcher to ask respondents to say their thoughts out loud as they are engaging with various stimuli, and eye-tracking, which can provide objective insight into the qualities of images that give readers pause and the elements that they are most attracted to. Even in the Qualtrics survey format, one interesting option not used here is the possibility of asking respondents to click on the part of the picture that stands out to them most, thus generating a heat map from the aggregate responses.

7.3 Implications for photojournalism theory

Following Hariman & Lucaites (2016) and other scholars moving to recognize the role of photography in building a “visual” public sphere, this thesis demonstrates the unparalleled potential of photojournalism, a rich, complex and yet immediate

language, to communicate about issues of international scope. Certain examples of the photojournalistic coverage of climate change show that it is not only possible, but already being done. For example, photographer Joan Sullivan focuses exclusively on telling the visual story of renewable energy. The duo Braschler/Fischer published dignified, straightforward portraits of real people being affected by climate change (*The Human Face of Climate Change*). Photographer James Whitlow Delano started an Instagram channel called @everydayclimatechange where professional photographers contribute vivid, human-scale photos of people living with climate change in all corners of the world. The account already has 85 thousand followers. Traditional media outlets also produce some exceptionally engaging visual journalism, such as the series on American climate refugees by Josh Haner in *The New York Times* or the work by Michael Robinson Chavez on the dangers of cobalt mining – a result of the high demand for lithium ion batteries powering “clean” cars. What this research has demonstrated, however, is that photojournalism is at risk of falling prey to a long-standing temptation towards anesthetization, especially in a context where images are in ever higher demand, yet staffing on photo desks is limited. When the criteria for photo selection are primarily based on vague words like “compelling” – the single most often uttered word by photo editors who approve of a photo – there is a risk that form will win over content. Perhaps this risk is not as detrimental to engagement as a theoretical study might lead to expect; The experiment chapter has demonstrated as much.

The most important finding for photojournalism studies is that photography in the newsroom falls prey to a particular conundrum in the current news economy: ever

more photojournalists are being laid off, yet the importance of photography both as an anchor for stories and as a source of information has never been more highly recognized. There is a clear need to further investigate the agenda-setting role of photography: in other words, to examine whether it is a regular occurrence that good photographs bring obscure stories into the light of the front (home) page. If this fact were more broadly recognized, perhaps investing more, not less resources in photo desks would be seen as a valuable and necessary move.

7.4 Implications for climate communicators

Corner et al. (2015) of the Climate Outreach group have done a great service to climate communicators, not only conducting focus group research in several countries comparing the effectiveness of various types of images, but also providing a free-to-use database of the most engaging images. One of their findings suggest that while audiences respond most strongly to photos of climate impacts, the emotion brought on by that viewing experience can sometimes lead to a sense of being overwhelmed and result in despondent attitudes to climate change. This had already been established by O'Neill (2009). This thesis has demonstrated that photo editors are largely unaware of the benefits in combining images of impact with images heightening self-efficacy. In general, the interviews showed that the selection of climate change photographs is not the product of considerable reflection in all cases. Then again, the experiment survey showed that news audiences respond more vividly to tested and true dire images of impact - which does not necessarily mean that this response will translate into concrete action down the road or even a deeper long-term concern. Overall, it can be said that the role of photographs as providing a view of

irrefutable evidence of climate change impact that cannot be as effectively described in words is still a valuable form of visual public engagement, recognized by audience members as influencing their understanding of the story and its importance.

The Instagram content analysis showed that communicators can benefit from paying more attention to the potential of photography as a tool for presentation of self and the propagation of descriptive social norms. If there is a visual public sphere on image-based social media sites such as Instagram, its power rests precisely in this twinning of self-promotion and social consciousness.

7.5 Future research directions

Each aspect of climate change communication through photographs studied in this thesis warrants more systematic and close inspection. For example, individuals who posted to Instagram using the hashtag #climatechange could be contacted and interviewed about their motivations for posting. As mentioned before, much more work is needed to fully understand the implications of the apocalyptic sublime trop in visual climate change rhetoric. In particular, more paired experiments could be conducted, where researchers would use think aloud protocols or eye-tracking software instead of pre-test and post-test survey questions used here. Finally, one actor central to the visual framing of climate change has been all but omitted in this research: the photographer. Future studies may benefit from focusing on photographers' motivations in pursuing climate change related stories, especially in a market where more and more photographers pursue their own personal projects, funded by grants, rather than by permanent employment with one news organization.

In 2011, when Julie Doyle analyzed the photographs chosen by Greenpeace to illustrate climate change in the late 1990s, she noted two tendencies: they strived to harness photography's inherent potential to serve as visual evidence of change, and they employed a visual rhetoric of catastrophe to stir viewers' emotions. The role of journalistic images of climate change is different than that of artistic images, and that of activist messages as well. Yet most of the visual framing employed by news images is still guided by those same principles. Photography can do so much more, and it is my hope that this research will help both theorists and professionals demand more from photojournalism and expand the visual framing of climate change to include images that will engage citizens to know, care, and act.

Appendices

A. Interview guide for photo editor interviews

Thank you so much for agreeing to be interviewed. Please note that the interview is being recorded for note taking purposes, but nobody will have access to the recording besides me.

The interview is structured in three parts:

1. Questions about your role in the news organization, as well as how you see the place of photojournalism in the publication, what is the situation like with staffing, etc.
2. Questions about the way your paper has covered climate change in the last 10 years
3. Questions about the visual (photojournalistic coverage) of climate change specifically

1. First set – photojournalism at your paper

- Who are you and how long have you held your current position? What does your typical day look like? Which meetings do you participate in? Describe your interactions with other departments in the newsroom.
- How many photographers do you have? How many other photo editors are there? Has this changed in recent years? Why?

- Do you think photography is treated seriously at your paper? What is the relationship with the “word” side and news editors?
- Is visual involved early enough in story elaboration?
- Do you have significant influence over what stories are highlighted (based on availability of visuals, for example)?

2. Second set – climate change as a news issue covered by your paper

- How has the coverage of climate change evolved over the last ten years? Has it moved from environment/science news to more mainstream news?
- Is climate change a major story of its own, or is it covered through other stories that relate to it?
- Compared to other papers, does your paper cover climate change differently? How?
- Do people in the newsroom consider it important? Is there a sense of mission/public duty when addressing this topic? Why or why not?

3. Third set – visual coverage of climate change at your paper

- How important is it to have good visuals with climate change stories? Why? Which visuals work the best (cartoons, graphics, maps, photos)?
- What is the proportion of stories about climate change that have a picture?
- What is the proportion of wire versus in house photos in stories of climate change?
- What is the proportion of problem/solution photos? Why?

- When looking for wire photos, what are your reactions to the photos offered there? Is there enough variety? What strikes you about the available photos?
- When assigning a photographer for a story related to climate change, what do you emphasize and expect to get?
- Which photos resonate the most with your readers?

B. Coding table for Instagram data.

VARIABLE	POSSIBLE VALUES	DESCRIPTION	HYPOTHESIS
DATE	April 1, 2015 - April 27, 2016	Timestamp	Control
SOURCE	0=self; 1=other (news org, advocacy org, photographer, etc.)	Where did the user get the photo? Self-taken or "re-grammed" from another source?	
THEME	1-solution; 2-drought; 3-temp/weather abnormality; 4-other impact; 5-cause/polluter; 6-community/activism; 7-celebrities; 8-politics; 9-other	What aspect of climate change does the photo depict?	H1
SENTIMENT	2=negative, 1=positive, 0=neutral	Is the user's caption positive, negative or neutral in tone?	H2
AGENCY	1=yes, 0=no	Does the post show people doing something, the results of people doing something? Or does it show people merely reacting to something or suffering the consequences? Example: a cactus garden would be coded 1 (the result of people planting drought-friendly plants), but a picture of a person driving in extreme heat would be coded 0.	H3
FOCUS	0=nature only; 1=human included	Does the photo show only nature in relation to climate change or is human presence palpable too?	H3
# FOLLOWERS	0-1,000	Number of followers	H4; control
#TAGS	0-30	Number of tag words used	H4; control Also used to determine THEME
# LIKES	0-infinity	Number of "likes" (note: comparison only made with images posted by users with similar number of followers)	H4
# COMMENTS	0-infinity	Number of comments	H4
COMMENTS RELEVANT	0=no, 1=yes (at least one)	Are any of the comments about climate change as a topic?	H4

Green shading = unambiguous variables. Grey shading = Data generated by Instagram API. White background = data coded after testing for inter-coder reliability.

C. Survey questions for each experimental condition

Pretest

Assuming global warming is happening, do you think it is...

- Caused mostly by human activities
- Caused mostly by natural changes in the environment
- None of the above because global warming isn't happening

How important is the issue of climate change to you personally?

- Extremely important
- Very important
- Somewhat important
- Not too important
- Not at all important

Which of the following statements do you most agree with?

- Global warming isn't happening
- Humans can't reduce global warming, even if it is happening
- Humans could reduce global warming, but people aren't willing to change their behavior so we're not going to.
- Humans could reduce global warming, but it's unclear at this point whether we will do what's needed.
- Humans can reduce global warming, and we are going to do so successfully.

In the past year, have you taken concrete steps to reduce your carbon footprint?

Examples include eating less meat, using public transportation more, recycling, reducing air travel, etc.

- Yes
- No

In the past decade, have you engaged in any form of political action aimed at fighting climate change, such as writing your representative, adjusting your vote according to climate policy, signing petitions, etc.?

- Yes
- No

You are now going to read the following news story. Take your time to read the text and consider the picture and caption as well.

User was presented with one of six experimental conditions; see Chapter 6

Posttest

In one sentence, please summarize what the article is about.

What struck you the most about this article?

What did the photograph show?

Does this article make you feel more or less concerned about climate change?

- More
- The Same
- Less

Does this article make you want to do more personally to fight climate change?

- Yes
- No

D. Debriefing survey questions

The survey first asks which of the three photos the respondent had seen in the initial survey. Based on that input, it presents to the respondent the other photo for that same story. Then, the following questions are asked, with a possibility to go backwards in the survey to look at the photo again.

1. Please answer the following questions:
 - Which photo is more interesting? A B
 - Which photo fits the story better? A B
 - Which photo is more informative? A B
 - Which photo is more beautiful? A B

2. Which photo would you share on social media?
 - A
 - B
 - Neither

3. Which photo would you choose to publish, if you were the photo editor at *The Daily Surveyor*?
 - A
 - B
 - Neither, would rather look for a photo of _____

4. Please explain your decision.

Bibliography

- ADAMS, R. B., Jr., & KLECK, R. E. (2005). Effects of direct and averted gaze on the perception of facially communicated emotion. *Emotion*, 5(1), 3–11.
- ALANYALI, M., PREIS, T., MOAT, H. S., & BRAUNSTEIN, L. A. (2016). Tracking Protests Using Geotagged Flickr Photographs. *Plos One*, 11, 3.)
- ARPAN, L. M., BAKER, K., LEE, Y., JUNG, T., LORUSSO, L., & SMITH, J. (2006). News Coverage of Social Protests and the Effects of Photographs and Prior Attitudes. *Mass Communication & Society*, 9, 1, 1-20.
- ASPLUND, T. (2014) Climate change frames and frame formation: An analysis of climate change communication in the Swedish agricultural sector. Linköping Studies in Arts and Science No. 619, Linköping University.
- ASPLUND, T. (2016). Natural versus anthropogenic climate change: Swedish farmers' joint construction of climate perceptions. *Public Understanding of Science*, 25, 5, 560-575.
- AZOULAY, A. (2008). *The civil contract of photography*. New York: Zone Books.
- BABERINI, M., COLEMAN, C.-L., SLOVIC, P., & VÄSTFJÄLL, D. (2015). Examining the Effects of Photographic Attributes on Sympathy, Emotions, and Donation Behavior. *Visual Communication Quarterly*. 22, 118-128.
- BALDWIN, C., & CHANDLER, L. (2010). "At the water's edge": community voices on climate change. *Local Environment*, 15, 7, 637-649.
- BARTHES, R. (1981). *Camera lucida: Reflections on photography*. New York: Hill and Wang.
- BECK, U. (2009). *World at risk*. Cambridge, UK, Polity.
- BECK, U. & CRONIN, C. (2006). *The cosmopolitan vision*. Cambridge, UK; Malden, MA: Polity.
- BELL, P. "Content Analysis of Visual Images" in VAN LEEUWEN, T., & JEWITT, C. (2001). *Handbook of visual analysis*. London, Sage.
- BENJAMIN, W. (1982). "The Author as Producer." in Burgin, V. (1982). *Thinking photography*. London: Macmillan.
- BERGER, M. (2010). *For All the World to See: Visual Culture and the Struggle for Civil Rights*. New Haven and London: Yale University Press.

- BIGNELL, J. (1997), *Media Semiotics: An Introduction*. Manchester [England]: Manchester University Press.
- BISSELL, K. L. (2000). A return to Mr. Gates': Photography and objectivity. *Newspaper Research Journal*. 21, 81-93.
- BONILLA, Y., & ROSA, J. (2015). #Ferguson: Digital protest, hashtag ethnography, and the racial politics of social media in the United States. *American Ethnologist*. 42, 4-17.
- BOYCE, T., & LEWIS, J. (2009). *Climate change and the media*. New York, Peter Lang.
- BOYKOFF MT, & RAJAN SR. (2007). Signals and noise. Mass-media coverage of climate change in the USA and the UK. *EMBO Reports*. 8, 207-11.
- BOYKOFF, M. T. (2007). Flogging a dead norm? Newspaper coverage of anthropogenic climate change in the United States and United Kingdom from 2003 to 2006. *Area*. 39, 470-481.
- BOYKOFF, M. T. (2011). *Who speaks for the climate?: making sense of media reporting on climate change*. Cambridge, UK, Cambridge University Press.
- BOYKOFF, M. T., & BOYKOFF, J. M. (2004). Balance as bias: global warming and the US prestige press. *Global Environmental Change*. 14, 125-136.
- BOYKOFF, M., & BOYKOFF, J. (2007). Climate change and journalistic norms: A case-study of US mass-media coverage. *Geoforum*. 38, 1190-1204.
- BRAUN, V., & CLARKE, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 2, 77-101.
- BRENTHHEL, A. (2016). *The Drowning World: The visual culture of climate change*. Lund: Lund University (Media-Tryck)
- BRÖNNIMANN, S. (2002). Picturing climate change. *Climate Research*. 22, 87-95.
- BRUNS A., & BURGESS J. (2012). Researching News Discussion on Twitter: New methodologies. *Journalism Studies*. 13, 801-814.
- BRUNS A., HIGHFIELD T., & BURGESS J. (2013). The Arab Spring and Social Media Audiences: English and Arabic Twitter Users and Their Networks. *American Behavioral Scientist*. 57, 871-898.

- BRUNS, A. & HIGHFIELD, T. (2016). Is Habermas on Twitter? Social Media and the Public Sphere. in BRUNS, A., ENLI, G., Skogerbø, E., Larsson, A. O., & Christensen, C. The Routledge companion to social media and politics. (Ebook)
- BRUNS, A., & STIEGLITZ, S. (2013). Towards more systematic Twitter analysis: metrics for tweeting activities. *International Journal of Social Research Methodology*. 16, 91-108.
- BUELL, L. (1995). *The Environmental Imagination: Thoreau, nature writing, and the formation of American Culture*. Cambridge, MA: Harvard University Press.
- BURKE, E. (1756). "A philosophical enquiry into the origin of our ideas of the sublime and beautiful."
- CAMPBELL KELLER, A. (2009). *Science in environmental policy: the politics of objective advice*. Cambridge, Mass, MIT Press.
- CAMPBELL, D. (2011). The Iconography of Famine, in *Picturing Atrocity: Reading Photographs in Crisis*, edited by Geoffrey Batchen, Mick Gidley, Nancy K. Miller, Jay Prosser. London: Reaktion Books.
- CAMPBELL, D. (2012). "This photo is not just what it is: reading the World Press Photo debate." February 20. Published on www.david-campbell.org
- CAPLE, H. (2013). *Photojournalism: a social semiotic approach*. Houndmills, Basingstoke, Hampshire: Palgrave Macmillan.
- CHESS, C. & JOHNSON, B.B. (2007). 'Information is Not Enough', in MOSER, S. C., & DILLING, L. *Creating a climate for change: communicating climate change and facilitating social change*. Cambridge, Cambridge University Press.
- CHEW, C., EYSENBACH, G., & SAMPSON, M. (2010). Pandemics in the Age of Twitter: Content Analysis of Tweets during the 2009 H1N1 Outbreak. *Plos One*, 5, 11.)
- CHO H., WITTE K. (2005). Managing fear in public health campaigns: A theory-based formative evaluation process. *Health Promotion Practice*, 6(4), 482-90.
- CHRISTENSEN, M., NILSSON, A., & WORMBS, N. (2013). *Media and the politics of Arctic climate change: when the ice breaks*. Basingstoke: Palgrave Macmillan, 2013.
- CODY, E. M., REAGAN, A. J., MITCHELL, L., DODDS, P. S., & DANFORTH, C. M. (2015). Climate Change Sentiment on Twitter: An Unsolicited Public Opinion Poll. *Plos One*, 10, 8.

- COLEMAN, R. (2010). Framing the Pictures in Our Heads: Exploring the Framing and Agenda-Setting Effects of Visual Images. in: D'ANGELO, P., & KUYPERS, J. A. (2010). *Doing news framing analysis: empirical and theoretical perspectives*. New York, Routledge.
- COLEMAN, R., & BANNING, S. (2006). Network TV News' Affective Framing of the Presidential Candidates: Evidence for a Second-Level Agenda-Setting Effect through Visual Framing. *Journalism & Mass Communication Quarterly*. 83, 313-328.
- COLEMAN, R., & WASIKE, B. (2004). Visual Elements in Public Journalism Newspapers in an Election: A Content Analysis of the Photographs and Graphics in Campaign 2000. *Journal of Communication*, 54, 3, 456-473.
- COLEMAN, R., & WU, H. D. (2015). *Image and emotion in voter decisions: The affect agenda*. Lanham: Lexington Books.
- COOK, J. A. (2012). Poe and the apocalyptic sublime: "The fall of the house of usher." *Papers on Language and Literature*, 48, 1, 3-44.
- CORBETT, J.B. and DURFEE, J.L. (2004). Testing public (un) certainty of science: Media representations of global warming. *Science Communication* 26(2): 129-151.
- CORNER, A., & RANDALL, A. (2011). Selling climate change? The limitations of social marketing as a strategy for climate change public engagement. *Global Environmental Change*. 21, 1005-1014.
- CORNER, A., WEBSTER, R. & TERIETE, C. (2015). *Climate Visuals: Seven principles for visual climate change communication (based on international social research)*. Oxford: Climate Outreach.
- COTTLE, S. (2009). *Global crisis reporting: journalism in the global age*. Maidenhead, Open University Press.
- COVELLO, V. (1998). Risk perception, risk communication, and EMF exposure: tools and techniques for communicating risk information. World Health Organization/ICNRP International Conference; Vienna, Austria.
- COX, A., CLOUGH, P., & SIERSDORFER, S. (2011). Developing metrics to characterize Flickr groups. *Journal of the American Society for Information Science and Technology*, 62, 3, 493-506.
- COX, J. (2013). An Exquisite Problem. in: *Black Maps: American Landscape and the Apocalyptic Sublime*, Steidl.

- COX, J. R. (2006). *Environmental communication and the public sphere*. Thousand Oaks, Sage Publications.
- CRAM, E., LOEHWING, M., & LUCAITES, J. L. (2016). Civic sights: Theorizing deliberative and photographic publicity in the visual public sphere. *Philosophy and Rhetoric*, 49, 3, 227-253.
- CRAPS, S. (2003). Cathartic Fables, Fabled Catharses: Photography, Fiction and Ethics in Graham Swifts 'Out of this World'. *European Journal of English Studies*, 7, 3, 293.
- Center for Research on Environmental Decisions. (2009). *The Psychology of Climate Change Communication: A Guide for Scientists, Journalists, Educators, Political Aides, and the Interested Public*. Columbia University, New York.
- DAHMEN, N. (2012). Photographic Framing in the Stem Cell Debate: Integrating Eye-Tracking Data for a New Dimension of Media Effects Research. *American Behavioral Scientist*. 56, 189-203.
- DEPT of DEFENSE. (2015). *National Security Implications of Climate-Related Risks and a Changing Climate*. July 23. <http://archive.defense.gov/pubs/150724-congressional-report-on-national-implications-of-climate-change.pdf?source=govdelivery> [Accessed January 3, 2017]
- DIFRANCESCO, D., & YOUNG, N. (2011). Seeing climate change: the visual construction of global warming in Canadian national print media. *Cultural Geographies*. 18, 517-536.
- DIRIKX, A., & GELDERS, D. (2010). To frame is to explain: A deductive frame-analysis of Dutch and French climate change coverage during the annual UN Conferences of the Parties. *Public Understanding of Science*. 19, 732-742.
- DOBRIN, S. I., & MOREY, S. (2009). *Ecossee: image, rhetoric, nature*. Albany, SUNY Press.
- DOHERTY, K. (2014). *From Alarm to Action: Closing the Gap Between Belief and Behavior in Response to Climate Change*. (Electronic Dissertation). Retrieved from <https://etd.ohiolink.edu/> on December 7, 2016.
- DOHERTY, K. & WEBLER, T. (2016). Social norms and efficacy beliefs drive the Alarmed segment's public-sphere climate actions. *Nature Climate Change* 6, 879-884.
- DOYLE J. (2009). Seeing the climate? The problematic status of visual evidence in climate change campaigning. In: Dobrin S., Money S., eds. *Ecossee: Images, Rhetoric and Nature*. New York: State University of New York Press; 279-297.

- DOYLE, J. (2007). Picturing the Clima(c)tic: Greenpeace and the Representational Politics of Climate Change Communication. *Science As Culture*. 16, 129-150.
- DOYLE, J. (2011). *Mediating climate change*. Farnham, Surrey, Ashgate.
- DUGGAN, M. (2015). *Mobile messaging and social media – 2015*. Pew Research Center. Available at: <http://www.pewinternet.org/2015/08/19/mobile-messaging-and-social-media-2015/> [Accessed April 13, 2016]
- DUNAWAY, F. (2009). Seeing Global Warming: Contemporary Art and the Fate of the Planet. *Environmental History*, 14, 1, 9-31.
- DUNAWAY, F. (2015). *Seeing green: The use and abuse of American environmental images*. Chicago: The University of Chicago Press.
- ENTMAN, R. M. (1991). Symposium: Framing U.S. Coverage of International News: Contrasts in Narratives of the KAL and Iran Air Incidents. *Journal of Communication*. 41, 6-27.
- ENTMAN, R. M. (1993). Framing: Toward Clarification of a Fractured Paradigm. *Journal of Communication*, Volume 43 (4), Winter, 1993, 51-58.
- ESTRIN, J. (2016). Photographing Climate Change Refugees, by Drone and on Foot. Interview with Josh Haner. *The New York Times Lens Blog*. <http://nyti.ms/2hsfNb3> [Accessed January 6, 2017]
- ESTRIN, J. (2015). The Year in Pictures: How We Made the Cut. *The New York Times LENS Blog*. Dec 22.
- EWBANK MP, BARNARD PJ, CROUCHER CJ, RAMPONI C, & CALDER AJ. (2009). The amygdala response to images with impact. *Social Cognitive and Affective Neuroscience*. 4, 127-33.
- FAHMY, S. (2005). Photojournalists' and Photo Editors' Attitudes and Perceptions: The Visual Coverage of 9/11 and the Afghan War, *Visual Communication Quarterly*, 12:3-4, 146-163.
- FAHMY, S. (2010). Contrasting visual frames of our times: A framing analysis of English- and Arabic-language press coverage of war and terrorism. *International Communication Gazette*. 72, 695-717.
- FALK, R. (2010) A Radical World Order Challenge: Addressing Global Climate Change and the Threat of Nuclear Weapons, *Globalizations*, 7:1-2, 137-155.

- FEINSTEIN, N. (Undated). "Public engagement with climate change." draft chapter, in *Climate change science and policy*. Online at [http://archive.cspo.org/igscdocs/Noah percent20Feinstein.pdf](http://archive.cspo.org/igscdocs/Noah%20Feinstein.pdf) [Accessed August 10, 2015]
- FELDMAN, L. & SOL HART, P. (2016). Using Political Efficacy Messages to Increase Climate Activism: The Mediating Role of Emotions. *Science Communication*, 38, 1, 99-127.
- FISHMAN, J. (2001). *Documenting death: Photojournalism and spectacles of the morbid in the tabloid and elite newspaper*, University of Pennsylvania, ProQuest Dissertations Publishing.
- FOUST, C. R. & O'SHANNON MURPHY, W. (2009). Revealing and Reframing Apocalyptic Tragedy in Global Warming Discourse, *Environmental Communication*, 3:2, 151-167
- GAMBINO, M. (2008). Danger Zones: David Maisel's aerial photographs of strip mines. *Smithsonian*, 38, 10, 52-57.
- GANN, T. M., & MATLOCK, T. (2014). The Semantics of Climate Change and Global Warming. In *Proceedings of the Thirty Sixth Annual Meeting of the Cognitive Science Society* (pp. 769-774).
- GARDUÑO FREEMAN, C. (2010). Photosharing on Flickr: intangible heritage and emergent publics. *International Journal of Heritage Studies*, 16, 352-368.
- GARNETT, J. & ARMITAGE, J. (2011). Virilio and visual culture: on the American apocalyptic sublime, in: Armitage, J. (2011). *Virilio now: Current perspectives in Virilio studies*. Cambridge, UK: Polity.
- GASTON, D. (2003). *Immaculate Destruction: David Maisel's Lake Project*. Aperture New York, 172, 38-45.
- GAVIN, N., LEONARD-MILSON, L., & MONTGOMERY, J. (2011). Climate change, flooding and the media in Britain. *Public Understanding of Science*. 20, 422-438.
- GEURIN-EAGLEMAN, A. N., & BURCH, L. M. (2016). Communicating via photographs: A gendered analysis of Olympic athletes' visual self-presentation on Instagram. *Sport Management Review*, 19, 2, 133-145.
- GHAZNAVI, J., & TAYLOR, L. D. (2015). Bones, body parts, and sex appeal: An analysis of #thinspiration images on popular social media. *Body Image*. 14, 54-61.

- GIBBS, M., MEESE, J., ARNOLD, M., NANSEN, B. & CARTER, M. (2015). #Funeral and Instagram: death, social media, and platform vernacular, *Information, Communication & Society*, 18:3, 255-268.
- GIBSON, R., & ZILLMANN, D. (2000). Reading between the Photographs: The Influence of Incidental Pictorial Information on Issue Perception. *JOURNALISM AND MASS COMMUNICATION QUARTERLY*. 77, 355-366
- GOFFMAN, E. (1974). *Frame analysis: An essay on the organization of experience*. New York: Harper & Row.
- GOOD, J. (2015). *Photography and September 11th: Spectacle, memory, trauma*. London ; New York : Bloomsbury, 2015
- GOYANES, M. (2014). An Empirical Study of Factors that Influence the Willingness to Pay for Online News. *Journalism Practice*, 8, 6, 742-757.
- GRABE, M. E., & BUCY, E. P. (2009). *Image bite politics: news and the visual framing of elections*. Oxford, Oxford University Press.
- GRABER, D. A. (1996). Say It with Pictures. *Annals of the American Academy of Political and Social Science*, 546, 85-96.
- GRITTMANN, E. (2014). Between Risk, Beauty and the Sublime: The Visualization of Climate Change in Media Coverage During COP15 in Copenhagen 2009. in: In Schneider, B., In Nocke, T., & Intergovernmental Panel on Climate Change. *Image politics of climate change: Visualizations, imaginations, documentations*. Bielefeld: Transcript.
- HAAGERUP, U. (2015). *Constructive News*. InnoVatio Publishing.
- HABERMAS, J. (1989). *The structural transformation of the public sphere: An inquiry into a category of bourgeois society*. Cambridge, Mass: MIT Press
- HAMMOND, P. & ORTEGA BRETON, H. (2016). Eco-apocalypse : environmentalism, political alienation, and therapeutic agency, in: Ritzenhoff, K. A., & In Krewani, A. (2016). *The apocalypse in film: Dystopias, disasters, and other visions about the end of the world*.
- HANNIGAN, J., (2006). *Environmental Sociology*, London: Routledge.
- HANSEN, A. (2002). Discourses of nature in advertising. *Communications*. 27, 499-511.
- HANSEN, A. (2011). Communication, media and environment: Towards reconnecting research on the production, content and social implications of environmental communication. *International Communication Gazette*. 73, 1-2.

- HANSEN, A., & COX, J. R. (2015). *Routledge handbook of environment and communication*. Abingdon, Oxon ; New York, NY : Routledge.
- HANSEN, A., & MACHIN, D. (2008). Visually branding the environment: climate change as a marketing opportunity. *Discourse Studies*. 10, 777-794.
- HANSEN, A., & MACHIN, D. (2013). Researching Visual Environmental Communication. *Environmental Communication: A Journal of Nature and Culture*. 7, 151-168.
- HARIMAN, R., & LUCAITES, J. L. (2003). Public Identity and Collective Memory in U.S. Iconic Photography: The Image of "Accidental Napalm." *Critical Studies in Media Communication*, 20, 1, 35-66.
- HARIMAN, R., & LUCAITES, J. L. (2007). *No caption needed: iconic photographs, public culture, and liberal democracy*. Chicago, University of Chicago Press.
- HARIMAN, R., & LUCAITES, J. L. (2016). *The public image: Photography and civic spectatorship*. Chicago: The University of Chicago Press.
- HARRISON, C. (2003). Applied Theory - Visual Social Semiotics: Understanding How Still Images Make Meaning. *Technical Communication*, 50, 1, 46.
- HART P.S., & NISBET E.C. (2012). Boomerang Effects in Science Communication: How Motivated Reasoning and Identity Cues Amplify Opinion Polarization About Climate Mitigation Policies. *Communication Research*. 39, 701-723.
- HART, P. (2011). One or Many? The Influence of Episodic and Thematic Climate Change Frames on Policy Preferences and Individual Behavior Change. *Science Communication*, 33, 1, 28-51.
- HART, P. S. and FELDMAN, L. (2016). The Impact of Climate Change-Related Imagery and Text on Public Opinion and Behavior Change. *Science Communication*, 38, 4, 415-441.
- HART, P. S., & FELDMAN, L. (2014). Threat Without Efficacy? Climate Change on U.S. Network News. *Science Communication*. 36, 325-351.
- HIGHFIELD, T., & LEAVER, T. (2015). A methodology for mapping Instagram hashtags. *First Monday*. 20:1.
- HILES, S. S., & HINNANT, A. (2014). Climate Change in the Newsroom: Journalists' Evolving Standards of Objectivity When Covering Global Warming. *Science Communication*.

- HIRSCH, M. (2002). The Day Time Stopped. *The Chronicle Review*, January 25.
- HITLIN, H. & HOLCOMB, J. (2015). From Twitter to Instagram, a different #Ferguson conversation. Pew Research Center. April 6.
- HO H.-N., VAN DOORN G.H., KAWABE T., WATANABE J., SPENCE C. (2014) Colour-Temperature Correspondences: When Reactions to Thermal Stimuli Are Influenced by Colour. *PLoS One* 9(3).
- HOLMBERG, K. & HELLSTEN, I. (2015). Gender differences in the climate change communication on Twitter. *Internet Research*, 25, 5, 811-828.
- HOLSANOVA, J., HOLMQVIST, K., & RAHM, H. (2006). Entry points and reading paths on newspaper spreads: comparing a semiotic analysis with eye-tracking measurements. *Visual Communication*, 5, 1, 65-93.
- HORN, R. E. (1999). "Information design: Emergence of a new profession." in *Information design*, ed. R. Jacobson, Cambridge, MA: The MIT Press, 15–33. <http://www.pewresearch.org/fact-tank/2013/11/11/at-newspapers-photographers-feel-the-brunt-of-job-cuts/>
- HORNSEY, M. J., HARRIS, E. A., FIELDING, K. S., & BAIN, P. G. (2016). Meta-analyses of the determinants and outcomes of belief in climate change. *Nature Climate Change*, 6, 622-626.
- HOSKINS, A. (2004). *Televising war: From Vietnam to Iraq*. London: Continuum.
- HU, Y., MANIKONDA, L., & KAMBHAMPATI, S. (2014). What We Instagram: A First Analysis of Instagram Photo Content and User Types. *International AAAI Conference on Web and Social Media*.
- HULME, M. (2009). *Why we disagree about climate change: understanding controversy, inaction and opportunity*. Cambridge, UK, Cambridge University Press.
- HULME, M. (2015). Climate and its changes: a cultural appraisal. *Geo: Geography and Environment*, 2, 1, 1-11.
- IPCC. (2014). *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland. Summary for Policymakers.
- IYENGAR, S. (1992). How Television News Affects Voters: From Setting Agendas to Defining Standards, *Notre Dame Journal of Law, Ethics & Public Policy*, 6(1).

- JACKSON, J. H. (2011). Envisioning disaster in the 1910 Paris flood. *Journal of Urban History*, 37, 2, 176-201.
- JACKSON, M. (2015). *Glaciers and climate change: Narratives of ruined futures*. Wiley Interdisciplinary Reviews: Climate Change, 6, 5, 479-492.
- JANG, S. M., & HART, P. S. (2015). Polarized frames on “climate change” and “global warming” across countries and states: Evidence from Twitter big data. *Global Environmental Change*, 32, 11-17.
- JANOSKE, M., LIU, B., and SHEPPARD, B. (2012). “Understanding Risk Communication Best Practices: A Guide for Emergency Managers and Communicators,” Report to Human Factors/Behavioral Sciences Division, Science and Technology Directorate, U.S. Department of Homeland Security. College Park, MD: START.
- JEWITT, C. & OYAMA, R. (2001). “Visual Meaning: A Social Semiotic Approach.” Chapter 7 in VAN LEEUWEN, T., & JEWITT, C. (2001). *Handbook of visual analysis*. London: Sage.
- KAHAN, D. M., WITTLIN, M., PETERS, E., SLOVIC, P., LARRIMORE OUELLETTE, L., BRAMAN, D., MANDEL, G. N., (2011). *The Tragedy of the Risk-Perception Commons: Culture Conflict, Rationality Conflict, and Climate Change* Temple University Legal Studies Research Paper No. 2011-26; Cultural Cognition Project Working Paper No. 89; Yale Law & Economics Research Paper No. 435; Yale Law School, Public Law Working Paper No. 230. Available at SSRN: <https://ssrn.com/abstract=1871503>
- KAPLAN, E. A. (2016). *Climate trauma: Foreseeing the future in dystopian film and fiction*.
- KEEFE RHODES, N. (2012). “Battling Climate Change with Art & Activism”, *Syracuse University Magazine*, Spring 2012
- KELLER, A. C. (2009). *Science in environmental policy the politics of objective advice*. Cambridge, Mass, MIT Press.
- KENNEDY, L. (2008). *Securing vision: photography and US foreign policy*. *Media, Culture & Society*. 30, 279-294.
- KHARROUB, T., & BAS, O. (2015). Social media and protests: An examination of Twitter images of the 2011 Egyptian revolution. *New Media & Society*.
- KIRILENKO, A. P., & STEPCHENKOVA, S. O. (2014). Public microblogging on climate change: One year of Twitter worldwide. *Global Environmental Change*, 26, 171-182.

- KIRILENKO, A. P., MOLODTSOVA, T., & STEPCHENKOVA, S. O. (2015). People as sensors: Mass media and local temperature influence climate change discussion on Twitter. *Global Environmental Change*, 30, 92-100.
- KLUNGSETH, N. J. (2012). Shadowing: a valuable approach to facility management research. *Proceedings of the 11th EuroFM Research Symposium*.
- KNOBLOCH, S., HASTALL, M., ZILLMANN, D., & CALLISON, C. (2003). Imagery Effects on the Selective Reading of Internet Newsmagazines. *Communication Research*, 30(1), 3-29.
- KOLISKA, M., & ROBERTS, J. (2015). Selfies: Witnessing and Participatory Journalism with a Point of View. *International Journal Of Communication*, 9, 14.
- KRATZER, R., & KRATZER, B. (2003). How Newspapers Decided to Run Disturbing 9/11 Photos. *Newspaper Research Journal*, 24, 1, 34-47.
- KRESS, G. R., & Van, LEEUWEN. T. (1996). *Reading images: The grammar of visual design*. London: Routledge.
- KRIPPENDORFF, K. (2004). *Content analysis: An introduction to its methodology*. Thousand Oaks, California: Sage.
- KUNREUTHER, H., & WEBER, E. U. (2014). Aiding Decision Making to Reduce the Impacts of Climate Change. *Journal of Consumer Policy : Consumer Issues in Law, Economics and Behavioural Sciences*, 37, 3, 397-411.
- KUNSTLER, J. H. (2005). *The long emergency: surviving the converging catastrophes of the twenty-first century*. New York, Atlantic Monthly Press.
- LANDSBERGER, H. A. (1958). *Hawthorne Revisited*. Ithaca, New York: The New York State School of Industrial and Labor Relations.
- LEDOUX, J. (1986). Sensory systems and emotion. *Integrative Psychiatry* 4, 237–248.
- LEISEROWITZ, A., FEINBERG, G., HOWE, P., & ROSENTHAL, S. (2013). *Climate change in the American mind: A focus on California, Colorado, Ohio, and Texas*. Yale University. New Haven, CT: Yale Project on Climate Change Communication.
- LEÓN, B., & ERVITI MC. (2015). Science in pictures: Visual representation of climate change in Spain's television news. *Public Understanding of Science*. 24, 183-99.

- LESTER, L. (2010). *Media and environment: conflict, politics and the news*. Cambridge, UK, Polity.
- LESTER, L., & COTTLE, S. (2009). Visualizing Climate Change: Television News and Ecological Citizenship. *International Journal Of Communication*, 3, 17.
- LEVENE, M. (2013). "Climate Blues: or How Awareness of the Human End might re-instil Ethical Purpose to the Writing of History." *Environmental Humanities*, vol. 2: 147-167.
- LEVISTON, Z., PRICE, J., & BISHOP, B. (2014). Imagining climate change: The role of implicit associations and affective psychological distancing in climate change responses. *European Journal of Social Psychology*. 44, 441-454.
- LEWALLEN, J., & BEHM-MORAWITZ, E. (2016). Pinterest or Thinterest?: Social Comparison and Body Image on Social Media. *Social Media + Society*, 2, 1.
- LINDER, S. (2006). Cashing-in on Risk Claims: On the For-profit Inversion of Signifiers for "Global Warming." *Social Semiotics*. 16, 103-132.
- LIU, B. (2012). *Sentiment analysis and opinion mining*. San Rafael, Calif: Morgan & Claypool.
- LORENZONI, I., NICHOLSON-COLE, S., & WHITMARSH, L. (2007). Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environmental Change*. 17, 445-459.
- MANZO, K. (2010a). Imaging vulnerability: the iconography of climate change. *Area*. 42, 96-107.
- MANZO, K. (2010b). Beyond polar bears? Re-envisioning climate change. *Meteorological Applications*. 17, 196-208.
- MARKHAM, A. and BUCHANAN, E. (2012). *Ethical decision-making and Internet Research. Recommendations from the AoIR Ethics Working Committee (version 2.0)*
- MARX, S. M., WEBER, E. U., ORLOVE, B. S., LEISEROWITZ, A., KRANTZ, D. H., RONCOLI, C., & PHILLIPS, J. (2007). Communication and mental processes: Experiential and analytic processing of uncertain climate information. *Global Environmental Change*, 17, 1, 47-58.
- MCCOMBS, M. E. (2015). "A Look at Agenda Setting: Past, Present and Future," *Journalism Studies*, 6 543-557.

- MCDONALD, S. (2005). Studying actions in context: a qualitative shadowing method for organizational research. *Qualitative Research*, 5, 455-473.
- MCNALLY, M. (2006). Talk to the Newsroom: Assistant Managing Editor for Photography Michele McNally. *The New York Times*.
- MENDELSON, A. (2001). Effects of Novelty in News Photographs on Attention and Memory. *Media Psychology*, 3, 2, 119-157.
- MENDELSON, A., & DARLING-WOLF, F. (2009). Readers' interpretations of visual and verbal narratives of a National Geographic story on Saudi Arabia. *Journalism*, 10, 6, 798-818.
- MESSARIS, P., & ABRAHAM, L. (2001). Role of images in framing news stories. in: REESE, S. D., GANDY, O. H., & GRANT, A. E. *Framing public life: perspectives on media and our understanding of the social world*. Mahwah, N.J, Lawrence Erlbaum Associates.
- METAG, J., SCHÄFER, M. S., FÜCHSLIN, T., KLEINEN-VON KÖNIGSLÖW, K., & BARSUHN, T. (2016). Perceptions of Climate Change Imagery: Evoked Salience and Self-Efficacy in Germany, Switzerland, and Austria. *Science Communication*, 38, 2, 197-227.
- MOELLER, S. D. (1999). *Compassion fatigue: how the media sell disease, famine, war, and death*. New York, Routledge.
- MOELLER, S. D. (2006). "Regarding the Pain of Others": Media, Bias and the Coverage of International Disasters. *Journal of International Affairs*, 59, 173-196.
- MOON, J. H., LEE, E., LEE, J.-A., CHOI, T. R., & SUNG, Y. (2016). The role of narcissism in self-promotion on Instagram. *Personality and Individual Differences*, 101, 1, 22-25.
- MORENO, M. A., TON, A., SELKIE, E., & EVANS, Y. (2016). Secret Society 123: Understanding the Language of Self-Harm on Instagram. *Journal of Adolescent Health*, 58, 78-84.
- MORRIS, E. & SAYLER, S. (2014). "The Pensive Photograph as Agent: What Can Non-Illustrative Images Do to Galvanize Public Support for Climate Change Action?" in SCHNEIDER, B., & NOCKE, T. *Image politics of climate change: visualizations, imaginations, documentations*. Bielefeld, Transcript.
- MORTENSEN, T. (2014). Comparing the Ethics of Citizen Photojournalists and Professional Photojournalists: A Coorientational Study. *Journal of Mass Media Ethics*, 29, 1, 19-37.

- MOSER, S. C. (2009). Communicating climate change and motivating civic action: Renewing, activating and building democracies. pp. 283-302 in SELIN, H. & VANDEVEER, S.D. (eds.), *Changing Climates in North American Politics: Institutions, Policymaking and Multilevel Governance*. Cambridge, MA: The MIT Press.
- MOSER, S. C. (2010). Communicating climate change: history, challenges, process and future directions. *Wiley Interdisciplinary Reviews: Climate Change*. 1, 31-53.
- MOSER, S. C., & DILLING, L. (2007). *Creating a climate for change: communicating climate change and facilitating social change*. Cambridge, Cambridge University Press.
- MOSER, S. C., & DILLING, L. (2011) *Communicating climate change: closing the science-action gap in DRYZEK, J. S. Oxford handbook of climate change and society*. Oxford, Oxford University Press.
- MYERSON, G., & RYDIN, Y. (1996). *The language of environment: a new rhetoric*. London, UCL Press.
- MYRONE, M., (2013). 'John Martin's Last Judgement Triptych: The Apocalyptic Sublime in the Age of Spectacle', in Nigel Llewellyn and Christine Riding (eds.), *The Art of the Sublime*, Tate Research Publication.
- NATIONAL ACADEMY OF SCIENCES. (2014). *Imagining Deep Time. Exhibition Catalogue*. Curated by JD Talasek.
- NERLICH, B., & JASPAL, R. (2014). Images of Extreme Weather: Symbolising Human Responses to Climate Change. *Science As Culture*, 23, 2, 253-276.
- NERLICH, B., KOTEYKO, N., & BROWN, B. (2010). Theory and language of climate change communication. *Wiley Interdisciplinary Reviews: Climate Change*. 1, 97-110.
- NEVERLA, I., & SCHÄFER, M. S. (2012). *Das Medien-Klima Fragen und Befunde der kommunikationswissenschaftlichen Klimaforschung*. Wiesbaden, VS Verlag für Sozialwissenschaften.
- NEWTON, J. (2001). *The burden of visual truth. The role of photojournalism in mediating reality*. Mahwah, N.J.: Lawrence Erlbaum Associates.
- NEWTON, J. H. (2001). *The burden of visual truth: The role of photojournalism in mediating reality*. Mahwah, N.J: Lawrence Erlbaum Associates.

- NICHOLSON-COLE, S. A. (2005). Representing climate change futures: a critique on the use of images for visual communication. *Computers, Environment and Urban Systems*. 29, 255-273.
- NISBET, M.C., SCHEUFELE, D.A., (2009). What's next for science communication? Promising directions and lingering distractions. *American Journal of Botany*. 96, 1767-78.
- NPPA (National Press Photographers Association). (2015). "Eyetracking photojournalism: new research explores what makes a photograph memorable, shareable and worth publishing." January 27. See also presentation of results here: [http://www.ifra.com/WebSitepercent5CIFRAEvent.nsf/0/3744E5053AFDA9E748257E99002B1224/\\$File/QUINN_eyetrackingpercent20yourpercent20audience_WANIFRA.pdf](http://www.ifra.com/WebSitepercent5CIFRAEvent.nsf/0/3744E5053AFDA9E748257E99002B1224/$File/QUINN_eyetrackingpercent20yourpercent20audience_WANIFRA.pdf) [Accessed August 23, 2016]
- NYE, D. E. (1994). *American technological sublime*. Cambridge, Mass: MIT Press.
- O'NEILL, S. J., & SMITH, N. (2014). Climate change and visual imagery. *Wiley Interdisciplinary Reviews: Climate Change*. 5, 73-87.
- O'NEILL, S., & NICHOLSON-COLE, S. (2009). "Fear Won't Do It." *Science Communication*. 30, 355-379.
- O'NEILL, S., BOYKOFF, M., NIEMEYER, S., & DAY, S. (2013). On the use of imagery for climate change engagement. *Global Environmental Change*. 23, 413-421.
- O'NEILL, S. J. (2013). Image matters: Climate change imagery in US, UK and Australian newspapers. *Geoforum*. 49, 10-19.
- OCKWELL, D., WHITMARSH, L., & O'NEILL, S. (2009). Reorienting Climate Change Communication for Effective Mitigation. *Science Communication*. 30, 305-327.
- OPDENAKKER, R. (2006). Advantages and Disadvantages of Four Interview Techniques in Qualitative Research. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 7(4).
- ORESQUES, N., & CONWAY, E. M. (2010). *Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. New York: Bloomsbury Press.
- ORVELL, M. (2006). "After 9/11: Photography, The Destructive Sublime, And The Postmodern Archive." *Michigan Quarterly Review* (45:2), 238-256.

- OWENS, S., (2000). 'Engaging the public': information and deliberation in environmental policy. *Environment and Planning A* 32, 1141–1148.
- PACHLER, N., BACHMAIR, B., COOK, J., & KRESS, G. R. (2010). *Mobile learning: Structures, agency, practices*. New York: Springer. Chapter 7: "A social semiotic analysis of mobile devices: interrelations of technology and social habitus."
- PAIVIO, A., ROGERS, T. B., & SMYTHE, P. C. (1968). Why are pictures easier to recall than words? *Psychonomic Science*, 11, 137–138.
- PAK, A., & PAROUBEK, P. (2010). Twitter as a Corpus for Sentiment Analysis and Opinion Mining. In *LREc* , 10, 1320-1326.
- PALMER, D. (2013). 'Photography, Technology, and Ecological Criticism: Beyond the Sublime Image of Disaster' in Lester, L. and Hutchens, B. (eds.), *Environmental Conflict and the Media*, New York: Peter Lang, 75–90.
- PARRY, K. (2011). Images of liberation? Visual framing, humanitarianism and British press photography during the 2003 Iraq invasion. *Media, Culture and Society*. 33, 1185-1201.
- PAUWELS, L. (2015). *Reframing visual social science: towards a more visual sociology and anthropology*. Cambridge, United Kingdom: Cambridge University Press.
- PEEPLER, J. (2011). Toxic Sublime: Imaging Contaminated Landscapes. *Environmental Communication: A Journal of Nature and Culture*. 5, 373-392.
- PEIRCE, C. S. (1982) *The Writings of Charles S. Peirce: A Chronological Edition*. Eds. Peirce Edition Project. Bloomington I.N: Indiana University Press. Vol. 2
- PERLMUTTER, D. (1998). *Photojournalism and foreign policy: icons of outrage in international crises*. Westport, Conn, Praeger.
- PERLMUTTER, D. D., & WAGNER, G. L. (2004). The anatomy of a photojournalistic icon: marginalization of dissent in the selection and framing of "death in Genoa." *Visual Communication*. 3, 91-108.
- PEW Research Center. (2016). "The Politics of Climate." October.
- PEW Research Center. (2016). "State of the News Media 2016." June.
- PEW Research Center. (2015). "The Smartphone Difference" Available at: <http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015> [Accessed May 10, 2016]

- PEW Research Center. (2013). <http://www.pewresearch.org/fact-tank/2013/11/11/at-newspapers-photographers-feel-the-brunt-of-job-cuts/http://www.pewresearch.org/fact-tank/2013/11/11/at-newspapers-photographers-feel-the-brunt-of-job-cuts/>
- PITTMAN, M., & REICH, B. (2016). Social media and loneliness: Why an Instagram picture may be worth more than a thousand Twitter words. *Computers in Human Behavior*, 62, 155-167.
- POPP, R., & MENDELSON, A. (2010). "X'-ing out enemies: Time magazine, visual discourse, and the war in Iraq." *Journalism*. 11 (2): 203-221.
- POWELL, T. E., BOOMGARDEN, H. G., DE SWERT, K. and DE VREESE, C. H. (2015). A Clearer Picture: The Contribution of Visuals and Text to Framing Effects. *Journal of Communication*, 65: 997–1017.
- PUBLIC POLICY INSTITUTE OF CALIFORNIA. (2015). Californians' News and Information Sources. Available at: http://www.ppic.org/main/publication_show.asp?i=770 [Accessed November 28, 2015]
- RANCIÈRE, J., & ELLIOTT, G. (2009). *The emancipated spectator*. London: Verso.
- REBICH-HESPANHA S., RICE R.E., MONTELLO D.R., RETZLOFF S., TIEN S., & HESPANHA J.P. (2014). Image Themes and Frames in US Print News Stories about Climate Change. *Environmental Communication*.
- REBICH-HESPANHA, S., RICE, R. E., MONTELLO, D. R., RETZLOFF, S., TIEN, S., & HESPANHA, J. P. (2015). Image Themes and Frames in US Print News Stories about Climate Change. *Environmental Communication*, 9, 4, 491-519.
- RECKIEN, D., & EISENACK, K. (2013). Climate Change Gaming on Board and Screen: A Review. *Simulation & Gaming*, 44, 253-271.
- REMILLARD, C. (2011). Picturing environmental risk: The Canadian oil sands and the National Geographic. *International Communication Gazette*, 73, 127-143.
- ROBBINS, D. (2015). See the Media's Disconnect on Climate Change and Extreme Weather Illustrated on the Front Page. *Media Matters*. August 3. <http://mediamatters.org/research/2015/08/03/see-the-medias-disconnect-on-climate-change-and/204741> [Accessed August 25, 2016]
- ROESER, S. (2012). Risk Communication, Public Engagement, and Climate Change: A Role for Emotions. *Risk Analysis*. 32, 1033-1040.

- ROGELJ, J., DEN ELZEN, M., HÖHNE, N., FRANSEN, T., FEKETE, H., WINKLER, H., SCHAEFFER, R., SHA, H., RIAHI, K., MEINSHAUSEN, M. (2016). Paris Agreement climate proposals need a boost to keep warming well below 2 °C. *Nature*, 534, 7609, 631-9.
- ROSE, G. (2001). *Visual methodologies: an introduction to the interpretation of visual materials*. London, Sage. Chapter 5: Content Analysis. Counting What You (Think You) See.
- ROSEN, J. (2006) "The People Formerly Known as the Audience" *Pressthink*. http://archive.pressthink.org/2006/06/27/ppl_frmr.html [Accessed August 28, 2016]
- RÖSSLER, P., MÜLLER, R., BOMHOFF, J., HASCHKE, J. F., & KERSTEN, J. (2011). Selection and impact of press photography. An empirical study on the basis of photo news factors. *Communications*, 36, 4, 415-439.
- ROTHMAN, A. (2014). Landscape forensics. *Places Journal*. February. Available at: <https://placesjournal.org/article/landscape-forensics/> [Accessed 10/29/2016]
- SARGE, M. A., VANDYKE, M. S., KING, A. J., & WHITE, S. R. (2015). Selective perceptions of hydraulic fracturing. *Politics & Life Sciences*. 34, 57-72.
- SCANNELL, L., & GIFFORD, R. (2013). Personally relevant climate change: The role of place attachment and local versus global message framing in engagement. *Environment & Behavior*, 45, 60–85.
- SCHAFFER M.S., IVANOVA A., & SCHMIDT A. (2014). What drives media attention for climate change? Explaining issue attention in Australian, German and Indian print media from 1996 to 2010. *International Communication Gazette*. 76, 152-176.
- SCHMIDT, A., IVANOVA, A., & SCHAFFER, M. (2013). Media attention for climate change around the world: A comparative analysis of newspaper coverage in 27 countries. *Global Environmental Change*. 23, 1233-1248.
- SCHNEIDER, B., & NOCKE, T. (2014). *Image politics of climate change: visualizations, imaginations, documentations*. Bielefeld, Transcript.
- SCHOENFELD, A. C., MEIER, R. F., & GRIFFIN, R. J. (1979). Constructing a Social Problem: The Press and the Environment. *Social Problems*. 27, 38-61.
- SCHRAMM, W. (1949). The gatekeeper: A memorandum. In W. Schramm (Ed.), *Mass Communications*. Urbana, IL: University of Illinois Press.

- SCHUDSON, M. (2001). The objectivity norm in American journalism. *Journalism*, 2, 149-170.
- SCHWALBE, C. B. (2006). Remembering Our Shared Past: Visually Framing the Iraq War on U.S. News Websites. *Journal of Computer-Mediated Communication*, 12, 264-289.
- SELTZER, E., JEAN, N., KRAMER-GOLINKOFF, E., ASCH, D., & MERCHANT, R. (2015). The content of social media's shared images about Ebola: a retrospective study. *Public Health*, 129, 1273-1277.
- SEPPÄNEN, J., & VÄLIVERRONEN, E. (2003). Visualizing Biodiversity: The Role of Photographs in Environmental Discourse. *Science As Culture*, 12, 59-85.
- SHEFFIELD, J., and WOOD, E. F. "Projected changes in drought occurrence under future global warming from multi-model, multi-scenario, IPCC AR4 simulations." *Climate Dynamics* 31.1 (2008): 79–105
- SHURKUS, M. (2014). Camera Lucida and Affect: Beyond representation. *Photographies*, 7, 1, 67-83.
- SKRIMSHIRE, S. (2010). *Future ethics: Climate change and apocalyptic imagination*. London: Continuum.
- SKRIMSHIRE, S. (2014). *Climate change and apocalyptic faith*. Wiley Interdisciplinary Reviews: *Climate Change*, 5, 2, 233-246.
- SMALL, D. & VERROCHI, N. (2009). The Face of Need: Facial Emotion Expression on Charity Advertisements. *Journal of Marketing Research* 46, 777-787.
- SMALL, D. A., & LOEWENSTEIN, G. (2003). Helping a victim or helping the victim: Altruism and identifiability. *Journal of Risk and Uncertainty*, 26, 5-16.
- SMALL, T. A. (2011). What the Hashtag? *Information, Communication & Society*, 14, 872-895.
- SMITH & JOFFE. (2009). Climate change in the British press: the role of the visual. *Journal of Risk Research*, 12(5), 647–663
- SMITH DAHMEN, N. (2015). "Watchdog, Voyeur, or Censure?" *Journalism Practice*, 9(3).
- SMITH, N. W., & JOFFE, H. (2009). Climate change in the British press: the role of the visual. *Journal of Risk Research*, 12, 647-663.

- STOEKL, A. (2013). "After the sublime," after the apocalypse: Two versions of sustainability in light of climate change. *Diacritics*, 41, 3, 40-57.
- SVOBODA, M. (2016). Cli-fi on the screen(s): patterns in the representations of climate change in fictional films. *Wiley Interdisciplinary Reviews: Climate Change*, 7, 1, 43-64.
- SZERSZYNSKI, B. & TOOGOOD, M. (2000). "Global citizenship, the environment and the media" in STUART, A., ADAM, B. & CARTER, C., *Environmental risks and the media*. London: Routledge.
- SZERSZYNSKI, B., & URRY, J. (2006). Visuality, mobility and the cosmopolitan: inhabiting the world from afar. *The British Journal of Sociology*. 57, 113-131.
- VAN DE POEL, I., NIHLÉN FAHLQUIST, J., DOORN, N., ZWART, S., & ROYAKKERS, L. (2012). The Problem of Many Hands: Climate Change as an Example. *Science and Engineering Ethics*. 18, 49-67.
- VAN DER LINDEN S., MAIBACH E., & LEISEROWITZ A. (2015). Improving Public Engagement With Climate Change: Five "Best Practice" Insights From Psychological Science. *Perspectives on Psychological Science*. 10, 758-763.
- WALSH, L. (2015). The visual rhetoric of climate change. *Wiley Interdisciplinary Reviews: Climate Change*. 6, 361-368.
- WALTZ, R. (2014). "Journalists as Purveyors of Partial Truths." in Cudd, A. E., & Scholz, S. J. *Philosophical perspectives on democracy in the 21st century*. Cham; New York: Springer
- WATTS, S., & STENNER, P. (2012). *Doing Q methodological research: Theory, method and interpretation*. Los Angeles: Sage.
- WESSLER, H., WOZNIAK, A., HOFER, L., & LUCK, J. (2016). Global Multimodal News Frames on Climate Change: A Comparison of Five Democracies around the World. *The International Journal of Press/Politics*, 21, 4, 423-445.
- WHITMARSH, L., & LORENZONI, I. (2010). Perceptions, behavior and communication of climate change. *Wiley Interdisciplinary Reviews: Climate Change*. 1, 158-161.
- WHITMARSH, L., O'NEILL, S., & LORENZONI, I. (2011). *Engaging the public with climate change: behaviour change and communication*. London, Earthscan.
- WHITMARSH, L., SEYFANG, G., & O'NEILL, S. (2011). Public engagement with carbon and climate change: To what extent is the public 'carbon capable'? *Global Environmental Change*. 21, 56-65.

- WILLIAMS, R. (2005). Cognitive theory. in: SMITH, K. (2005). Handbook of visual communication research: theory, methods, and media. Mahwah, N.J., L. Erlbaum.
- WITTE, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communications Monographs*, 59(4), 329-349.
- WOLF, R. and GROTTA, G. L. (1985). Images: A question of readership. *Newspaper Research Journal*, 6 (2), 30-36.
- WORLD BANK GROUP. (2014). Turn Down the Heat: Confronting the New Climate Normal. Washington, DC: World Bank.
- YASCHUR, C. (2012). Shooting the shooter: How experience level affects photojournalistic coverage of a breaking news event. *Visual Communication Quarterly*, 19(3), 161-177.
- ZAPPAVIGNA, M. (2016). Social media photography: construing subjectivity in Instagram images. *Visual Communication*, 15, 3, 271-292.
- ZELIZER, B. (2004). The voice of the visual in memory. In PHILLIPS, K. R. (Ed.), *Framing public memory*. Tuscaloosa: University of Alabama. 157-186.
- ZELIZER, B. (2005). Journalism through the camera's eyes. In ALLAN, S. (ed.), *Journalism: Critical issues*. Berkshire: Open University Press. 167-176.
- ZELIZER, B. (2006). What's Untransportable About the Transport of Photographic Images? *Popular Communication: The International Journal of Media and Culture*, 4(1), 3-20.
- ZELIZER, B. (2010). *About to die: How news images move the public*. New York: Oxford University Press.
- ZELIZER, B., & Mazal Holocaust Collection. (1998). *Remembering to forget: Holocaust memory through the camera's eye*. Chicago: University of Chicago Press.
- ZHAO, X., LEISEROWITZ, A. A., MAIBACH, E. W., & ROSER-RENOUF, C. (2011). Attention to Science/Environment News Positively Predicts and Attention to Political News Negatively Predicts Global Warming Risk Perceptions and Policy Support. *Journal of Communication*. 61, 713-731.
- ZHOU, J. (2016). Boomerangs versus Javelins: How Polarization Constrains Communication on Climate Change. *Environmental Politics*. 25, 788-811.

ZILLMANN, D., KNOBLOCH, S., & YU, H. (2001). Effects of Photographs on the Selective Reading of News Reports. *Media Psychology*, 3, 4, 301-324.

ŽIŽEK, S. (2010). *Living in the End Times*. New York: Verso.