

**Summative Evaluation of Soundprint's Pole to Pole (NSF #0632194):
An Exploratory Study of the Impact of Radio Documentaries
on Listener Understanding of Science Research on Climate Change**

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This article presents an evaluation study looking at the impacts of radio documentaries on listeners' understanding of climate change and associated research processes. The study focused on climate because of the current public debate about the validity of climate change research and what actions the federal government should take in response to the impacts of climate change.

Climate change has received significant media coverage during the past year and remains an area of great public controversy. In a survey conducted in 2008 (Center for Climate Change Education, 2009), about half of Americans viewed global warming as a serious issue, with the other half having little interest in the issue, not seeing it as a threat, or strongly believing it wasn't happening. During the past year, there has been a sharp decline in the percentage of U.S. citizens who believe that humans cause recent climate change (Leiserowitz et. al., 2010).

Soundprint Media was awarded a grant from the National Science Foundation in 2007 to produce eight half-hour radio documentaries on scientific research in the Polar Regions. The programs have been broadcast on participating National Public Radio affiliates. Two programs that focused on climate change research were selected as the focus of the summative evaluation study.

RATIONALE FOR THE EVALUATION DESIGN

Radio listeners can find a variety of programs on science, ranging from short, 1-2 minutes programs such as *Stardate*, *EarthSky*, and *Science Update*, longer programs, such as *Science Fridays* and *Planetary Radio*.¹ Most evaluations of science radio programs have been conducted by recruiting listeners and then surveying the listeners to obtain their self-reported listening habits, comprehension of program contents, and reactions to the program formats. Listeners typically report positive listening experiences, but evaluation questions refer to their aggregate experiences, not to their experiences from listening to specific programs. These findings provide validation that the programs engage the interest of listeners in science and add to their knowledge base.

To complement these evaluations, this study asked listeners about their recall of content

¹ A listing of many of these programs can be found at:
http://www.google.com/Top/Science/News_and_Media/Radio_Programs/

and reactions to two radio documentaries on climate change. This evaluation differs from most other evaluations of radio programs, since participants listened to and were asked to respond to same two radio documentaries. Thus, participants were able to respond to the specific content of the two programs, rather than to their aggregate experiences in listening to programs such as *EarthSky*, over time.

The design of this study has inherent limitations. Since participants listened to the programs online and knew they would be participating in an evaluation study, their listening experiences were clearly different from typical radio listeners who tune in and listen casually while driving or participating in some other activity. However, social science has a long tradition of using artificial contexts to test concepts, so this evaluation follows in this tradition, but the findings must be interpreted against this background.

STUDY OBJECTIVES AND DESIGN

This evaluation study was designed with two broad objectives. The first was to gather objective data on what listeners heard and retained from the two programs by having participants fill out a written survey. The second was to gather self-report data on how the programs affected participants' views of science research and climate change.

Two focus groups discussions were conducted in Washington, DC, in May 2010; each lasted approximately one hour. Focus group participants were recruited through notices on neighborhood listserves and Craigslist in the Washington, DC area. The objective of the recruitment process was to recruit participants who listened to National Public Radio news and information programs and to recruit a group who, overall, were reasonably representative of the NPR listening audience. In their responses to the recruitment notice, prospective participants were asked for information about their gender, age, and radio listening habits. If the prospective participant met the screening criteria and were needed to create the desired demographic, they were asked to join the group. Participants were paid an incentive for their participation.

A total of 20 participants were recruited for the two focus groups sessions, which were held in Washington, D.C. The composition of the focus group groups paralleled NPR listener demographics. Thus, the group was older, reported higher incomes, and had higher levels of education than national averages.

The participants listened to two documentaries online, each about 30-minutes in length, 1-3 days prior to the session. A brief synopsis of each of the two documentaries follows:

Climate Change College: The program featured a group of people, some local and some visiting, who learned firsthand about climate change from scientists conducting research in Barrow, Alaska, the northernmost city in the U.S. The program included interviews with scientists, "climate college" participants, and background by the program host. Various topics were discussed in the program, including some of the traditional cultural activities of the Inuits related to whale hunting, indigenous knowledge of climate issues, using sea ice and snow data in climate models, ice sampling, measuring permafrost

carbon, collecting methane gas from arctic lakes, monitoring coastal erosion, and looking at changes in local bird and animal species that have occurred with global warming.

When Snow Melts in Svalbard: This program focused on the Svalbard archipelago, part of the islands in the Arctic Ocean controlled by Norway and a focal point of Arctic research. The program highlights the role that Polar regions play in regulating the climate and the sensitivity of Polar regions to climate change. Polar regions play a key role in regulating our climate. The program looked at monitoring snow melts as a climatic indicator, using a laser beam system to measure what kinds of particles reflect light (and potentially heat) back, glacial retreat, taking blood samples from birds to measure pollutants, and divers collecting sediment cores which can be examined for evidence of climate change.

Once at the session, participants were asked to fill out a survey asking for demographic data (age, race, education level), radio listening habits, and their recall of the contents of the programs. After filling out the survey, the participants listened to the programs and filled out a survey asking about their recall of program contents. After the surveys, participants took part in a focus group session that lasted about one hour.

RESULTS

The results will first be presented for the written survey, followed by the analysis of the focus group discussions.

Written Survey Results

The survey asked participants to provide written responses to a series of questions for each of the two documentaries. The responses were categorized by the evaluator.

For the first question, participants were asked, “Can you briefly summarize what the program was about?” For “Climate Change College,” 18 of 20 or 90% of the participants were able to describe what the program was about in a way that indicated they had understood one of the “big ideas” underlying the program. For “When Snow Melts in Svalbard,” the comparable figure was 16 of 20 or 80% of participants.

Some examples of positive responses for “Climate Change College” include:

- “A college funded by Ben & Jerry’s ice cream in Alaska so international scientists can gather and students can study the effects of climate change,” and
- “The rapid melting of glaciers as caused by CO carbons and how it affects the people, animals, and environment surrounding it.”

For the second question, participants were asked to list research questions and research techniques presented in the program. For “Climate Change College,” 90% (18/20) were

able to name at least one research question or technique, with an average of 2.25 responses per participant. For “When Snow Melts in Svalbard,” 75% (15/20) were able to name at least one research topic or technique, with an average of 1.7 responses per participant.

Some examples of positive responses for “When Snow Melts in Svalbard” are:

- “The effects of methane being released into the environment,” and
- “Field samples as well as drilling down into ice to measure ice thickness.”

For the third question, participants were asked what they learned from the programs. For “Climate Change College,” 90% (18/20) participants were able to describe at least one example they learned from “Climate Change College.” For “When Snow Melts in Svalbard,” 60% (12/20) provided at least one example of what they had learned from the program.

Some examples of positive responses for what was learned from “Climate Change College are: “Climate change is bringing animals to new habitats;” “The Natives are changing their lifestyle because the ice is disappearing;” and “The ice is receding from the shoreline; this impacts animal life and consequently human life also.” Some examples of “When Snow Melts” responses are: “Extraordinary rates of snow melt, particularly in the Arctic; effects on biodiversity;” “Methane levels are increasing; and “Glacier/fjords are rapidly melting, leading to moss concentrations and a higher population of birds.”

In summary, a great majority of focus group participants were able to recall major program themes and examples of research questions and topics presented in the programs. A majority was also able to provide one or more examples of what they had learned from the programs.

Focus Group Analysis

The two focus group sessions were held after participants had filled out the written survey. A series of broad topics were discussed with focus group participants: their views on climate change; impacts from listening to the programs; general views of research scientists featured in the programs; general views of science research presented in the programs; and surprising things they found out about climate change research.

Similar themes emerged from both focus groups, so the analysis of the two groups was combined. In this analysis, I largely try to let focus group participants speak for themselves by providing extensive direct quotes from participants’ comments.

Most participants believed climate change is the result of human activity. About two-thirds of participants (based on a hand count) stated that they believed climate change is the result of human activity. All participants had heard of climate change, with some

reporting they had heard negative reporting about climate change, such as “Climategate.” Typical comments were: “I generally believe that climate change is a grave and increasing threat to security, quality of life and environment. The program showed how close to home the threat is,” and “I believe climate change is more of a threat than terrorism.”

For some participants, the programs did not change their opinion, as exemplified by typical comments: “The programs did not change my opinion but it reinforced my view that a lot needs to be done to preserve our environment and counteract the damage humans have caused,” and “It reinforced my position that climate change is happening. It provided evidence that no matter the size of the change it will make a difference in a larger arena.”

The programs had an impact on a majority of participants. More than two-thirds of the participants reported that the programs had an impact on them. The types of impacts varied.

Several reported that, while they believed climate change was occurring, the programs expanded their understanding of the topic: “It’s broader and more diverse than I often think as a non-scientist,” and “(The programs) made me rethink things.” Some reported that the programs had increased their interest in the topic or motivated them to learn more: “(The programs) motivated me to become better informed. I was getting kind of jaded – every time I hear about global warming – OK, I agreed – but I didn’t really know the ins and outs of it,” and “I got more facts I can use with people who disparage this work.”

Participants were engaged by the impact of climate change on humans. Throughout the focus group discussions, participants made numerous comments about the impact of climate change on humans. A typical comment was, “...(the program) definitely added another dimension to how I understand climate change issue – put a human face on it.” Another commented, ““I have a new interest in learning about communities and how climate change is affecting them. They have been living that way for thousands of years – all of a sudden this rapid decay and decline in the environment – makes me want to research it more. It didn’t necessarily change my opinion but made me want to research it more.”

Participants were particularly engaged by the impact of climate change on the Inuit in Alaska, “Sometimes you think about climate change, you think about your own environment. This was not the normal way I think about it, studies being done in remote areas, areas where there aren’t many people.” Some also found it ironic that “(the Inuit) are bearing the brunt of it but they aren’t the cause. Some of it (climate change) might be natural but if there is a root cause. Before I thought there was something I could do, but now I think we need some radical rethinking.”

Many participants believed climate change research requires dedicated, detailed work. Most focus group participants hadn’t thought that much about what scientists do on an

everyday basis. There was some surprise at the everyday nature of carrying out research: “Research techniques were simple, almost like high school projects;” “It reminded me of science kits for young kids. Like how they measured snow melt;” and “The scientists in the program were outdoorsy, you have to appreciate that kind of condition to want to go there.”

There were comments on the detail and persistent work that was required: “Drudgery – saw a similar piece on 60 minutes – blown away that people will do this work;” “One immediate thing was the minutia – not part of a large project – the project in Norway had records for years – so it wasn’t that it was a big billboard that some giant thing was happening;” and “I’ve never really thought about science research before so I can’t say how it impacts my opinion – never thought about it -- but impressed at how detailed, specific and ‘nitty gritty’ the research was. When I think of climate change, I think big, I don’t think on the ground looking at things.”

Scientists don’t only work in labs. Some participants had thought of scientists in labs, of scientists as “bookworms.” One commented, “When I think of a scientist – they probably can only exist within their group – antisocial or something.” One participant commented, “When I think of science research, I think of labs. This wasn’t at all like that. This was out in the land, so it was a different set-up than what I think about.”

The programs seemed to introduce scientists as very active physically and intellectually. One participant said, “They would have to be cool people to go out there and brave the conditions that they do, they have to be real passionate.” Participants commented that the scientists in the programs “love what they do, they are very passionate” and “didn’t seem like they have lab coats on.” There were comments that “they seemed like they grew up doing this” and “It sounded like fun, how did they get the job?”

Scientists have an open mind: Most participants believed the scientists were, as one stated, “following a process, reporting on what they found” and not merely trying to find that would confirm what they already believed. Supporting this, participants pointed out examples of scientists in the programs who changed their minds: “One woman scientist came there thinking catching whales was wrong. Then when she got there, she realized if you do it properly it isn’t wrong,” and “I felt like I could trust the guy who said the ice could melt in his lifetime. Now his opinion has changed and he believes it will now be gone in his lifetime. He made a hypothesis at first, did some research, then changed his perspective.”

Scientists follow a research process driven by inquiry. Participants also discussed science as a process without a pre-determined outcome: “I didn’t get the idea it was an assumption. They have a clear record that there really is a change. I didn’t hear anyone making a political statement. They were just reporting the facts as they were recording them. They were just saying they have records going back to 1200. Now whether it is a man made occurrence or natural occurrence they didn’t really reference that;” “Driven by their work – scientists don’t want to assume they want to prove it. It’s not like a belief system (like religion) – they go through the scientific method first;” and “(The programs)

made me think about how a scientist has to go into research with a hypothesis but stay open-minded and objective.”

Some participants questioned the research process. There were a few participants who were skeptical about climate change research findings. Some suspected the government had underlying motives in climate change research, as typified by these comments: “Sometimes I have trouble believing global warming is a bigger issue than the government says – it may be a way of inflating gas prices,” and “I think it is the way for the government to raise taxes, charge exorbitant gas prices.”

Several others had questions how science research is conducted: “I don’t have a science background, I am always mystified. They talked about grants they had received. Where do they get these grants and these ideas and the money to fund it?” and “It would have been nice to hear more about how the data would be used or who was going to be paying for it. Who are they working for, where will this data end up, can the data be used and manipulated?”

Finally, several were asking the question, how much climate is natural vs. caused by human activity. Some typical comments were: “I still have question, how much is natural, how much is human, still so much is unknown,” and “I work in environmental law so I am familiar with the issues but one thing in the programs that jumps out – when talking about the methane gas – you always hear about the cows and we need to decrease our consumption. This made me questions about much is natural – which makes it so incredibly confusing – to some extent you are going to have cows on the earth – to how much natural methane would build up vs. human activity – parts of it are natural so we can’t forget.”

Surprises

Participants were surprised by some aspects of climate change research. One commented with surprise that Ben and Jerry’s Ice Cream funded some of the research. Some participants were also surprised that “they had written records going back to 1200 – who would have thought?” One participant was surprised by human impacts on a remote location such as Svalbard, “What surprised me was how something that happened 3000 miles away shows up in Norway in the water or in the air. What I do here affects everything else.” Another was surprised by the laborious nature of science, “What surprised me is the length of time it takes to measure results and reach a conclusion.” Finally, several participants were surprised by the impact of climate change on archaeological sites.

SUMMARY

The results can be briefly summarized as follows for the written survey (#1-3 below) and focus group discussions (#4-8 below):

1. Most participants accurately described one or more “big ideas” or “themes” presented in the programs. In the written survey, 90% of participants accurately reported at least one “big idea” or “theme” for “Climate Change College,” with 80% doing the same for “When Snow Melts in Svalbard.”
2. Most participants accurately listed one or more research topics or techniques. In the written survey, 90% of participants were able to list at least one research topic or technique for “Climate Change College; with 75% doing the same for “When Snow Melts in Svalbard.”
3. A majority of participants reported learning at least one concept from the programs. In the written survey, 90% of participants reported learning at least one new concept from “Climate Change College,” with 60% reporting the same for “When Snow Melts in Svalbard.” These lower percentages may be partially explained by two factors. First, in the focus group discussion, some participants reported that much of the content was familiar to them. Second, in the focus group discussions, some participants reported that the content of “When Snow Melts in Svalbard” was more technical and more difficult to understand than the other program.
4. The programs had a positive impact on two-third of participants. A large majority of participants reported that the programs had increased their interest in climate change, changed their thinking, motivated them to want to learn more, or encouraged them to advocate for actions to address the issue. (Two-thirds also are reported that, prior to the program, they accepted that climate change was occurring.)
5. Participants were very engaged by the impact of climate change on another culture. Some participants reported they when they heard news on climate change, it seemed abstract and not linked to impacts on specific communities. They reported that being very interested and engaged in how climate change was having significant impacts on the Inuit.
6. Scientists in the programs were seen as dedicated and open-minded professionals pursuing their research in difficult environments. The programs were effective in introducing scientists as “real” people who worked hard, worked outdoors, and had active intellects. This contrasted the stereotype some participants reported they had about scientists as “bookworms” confined to their labs.
7. Participants seemed surprised by the “nitty gritty” and laborious nature of research. Most of the participants seemed unfamiliar with what scientists actually do on a daily basis, with some reporting that when they think of science research, they think of scientists in labs. The programs effectively conveyed some of the research techniques and “nuts and bolts” aspects of climate change research.
8. Participants believed the research was conducted through a process of inquiry. They mentioned examples of scientists in the programs who described how they had changed

their minds. The programs were effective in presenting science as a process of asking questions and gathering data to get the answers.

In summary, while participants generally supported the view that climate change results from human activity, they did not have an in-depth understanding of climate change research prior to the programs. The programs were effective in introducing the “nitty gritty” nature of the research and the scientists’ approach to research – that it is a process of inquiry and not just seeking data that supports prior views. A great majority of participants were able to recall “big ideas” and specific research topics and techniques introduced in the programs. In brief, the Soundprint Media programs resulted in significant cognitive impacts and were successful in deepening the understanding that participants had of climate change research, climate change researchers, and the impacts climate change is having on humans and the environment.

These results suggest that media producers and informal science educators should place a greater emphasis on engaging the public in learning about who conducts science research and how it is conducted. Participants were often surprised when learning about the research techniques and finding out what the scientists in the programs were like as real people. The results also suggest that showing the impact of climate change on people and their local environments is effective in engaging interest in the topic. Reports in the news are often abstract and not linked to everyday lives or specific impacts on local environments.

Finally, it is important to reiterate the limitations and potential value and limitations of this study. This evaluation study included a relatively small number of participants (N=20), whose listening experiences were “artificial” (i.e., listening online for the purpose of participating in an evaluation). Thus, the results must be interpreted with this as background. However, this approach, like many social science experiments, has the benefit of allowing the focused analysis of experiences that are difficult to replicate in the real world.

References

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