



Global Warming's Six Americas: A Science Museum of Minnesota Audience Segmentation Analysis

Using an instrument developed by the Yale Project on Climate Change and the George Mason University Center for Climate Change Communication, The Science Museum of Minnesota conducted a survey of their visitors to learn about their visitors' attitudes toward global warming. Based on the results of this survey, Science Museum of Minnesota visitors were statistically indistinguishable from the general public with regards to their attitudes toward global warming. By using this national study, we were able to interpret our visitors' knowledge and attitudes with respect to national trends and make stronger arguments about museum visitors' need for more learning opportunities about global warming.

In fall 2008, The Yale Project on Climate Change and the George Mason University Center for Climate Change Communication surveyed over 2,100 adults nationwide to measure people's "climate change beliefs, attitudes, risk perceptions, motivations, values, policy preferences, behaviors, and underlying barriers to action" (Maibach, Roser-Renouf, & Leiserowitz, 2009, p. 1). They identified six different positions on global warming: the alarmed, the concerned, the cautious, the disengaged, the doubtful and the concerned. The results of this study indicate the need for better, and more comprehensive climate change education for adults.

Science museums could be poised as an excellent venue for this educational effort: adults already come to science museums to learn about science, and museums are a trusted resource (Lake, Snell, & Perry, 2001). However, before this study it was not known how science museum visitors compare to the national average with respect to this segmentation. As science museum visitors as a whole are better educated than the general public: 41% of visitors to the Science Museum of Minnesota (SMM) had graduated from college (Ellenbogen & Cohn, 2008), the national rate in 2003 was 27% (Census Bureau, 2003). Because of this disparity, people sometimes assume that science museum visitors must be more educated about climate change

and global warming, and thus less needy of further learning opportunities than others. To test this assumption, the Science Museum of Minnesota conducted a survey of its visitors using a shorten form of Maibach and colleagues' (2009) instrument.

The Six Americas

The six attitudes captured in Maibach and colleagues' (2009) study toward global warming span the spectrum of possible attitudes. Summaries Maibach et al.'s (2009) descriptions of each segment follow.

The Alarmed are fully convinced that global warming is happening and that it is caused by human actions. These people are already taking personal action to combat these human caused impacts and support a coordinated and aggressive national response. To the alarmed, there is no greater issue facing our community than human induced global warming. The alarmed believe that global warming is already harming US citizens and they are very worried.

The Concerned, like the alarmed, believe that global warming is a serious problem, caused by human action, and support forceful national action to mitigate change. The main difference between the concerned and the alarmed is the level of personal action; the concerned are less likely to be taking personal action or voicing their concerns about global warming. Although the concerned support action to mitigate global warming, they are more likely to see humanitarian problems (e.g., lack of universal health care, poverty, etc.) as more urgent than global warming. The concerned are worried about the impact of global warming, but do not see these impacts causing harm for another decade or so.

The Cautious also believe that human induced global warming is happening, but this belief is weak. They are less likely to believe that there is a scientific consensus about the causes of global warming than the alarmed and the concerned, and less likely to see it as a major problem that deserves immediate and coordinated national action. These people are not particularly well read about the causes, mitigation strategies, or possible consequences of global warming. Te cautious

do not see global warming impacting their own lives and believe that mild to moderately severe harm caused by global warming will not take place for about 35 years.

The Disengaged have not spent much time or effort thinking about global warming, its causes, or potential solutions. They are the most likely to answer 'I don't know' to questions about global warming and do not see it as a personally relevant concern. Although the disengaged are the most willing to change their minds about global warming, they do not see global warming impacting the quality of American life for about 30 years.

The Doubtful are a mixed group; some believe global warming is happening, some believe it is not, and others do not have an opinion. What distinguishes this group is their attitude that global warming, if happening, is not that severe, will not affect Americans for many decades, and that society is doing enough to address the problem. The doubtful have not thought much about global warming, but more than the disengaged. The doubtful are likely to believe that there is no scientific consensus about global warming, and that if it does happen, impacts will be slight and more than a lifetime into the future. Although the doubtful do not know much about global warming, they are unlikely to change their minds.

The Dismissive are fully convinced that global warming is not happening. Although they say that the issue is not important to them, they have spent a good deal of time reading and thinking about the issue and are sure that global warming is not happening. The dismissive believe that there is great disagreement amongst scientists who study global warming with some believing there is a consensus amongst scientists that global warming is not happening and is not caused by humans. Because of this strong belief, the dismissive do not support any action to mitigate global climate. Some flatly deny that the world is warming; others acknowledge that the world is warming, but aver that it is entirely natural. They do not think global warming will harm people in general, and believe that it will never harm people living in the United States.

(Maibach et al., 2009, p. 1)

Methods

The original audience segmentation study conducted by Maibach et al. (2009) consisted of 149 multipart questions to determine a person's global warming position; we utilized a shortened version of the survey originally developed for KQED, available on Facebook, and on the Yale Project for Climate Change Communication's website (<http://environment.yale.edu/climate/>)

The shortened version has 16 questions, selected to best approximate one's global warming audience segment. According to Roser-Renouf, the short survey is 80% accurate overall when compared to the full survey (personal communication 1/10/10). However, the short survey is not equally predictive for each segment (Table 1).

Table 1: Accuracy of Short Survey

Segment	Correlation of Short Survey	Segment	Correlation of Short Survey
Alarmed	79%	Disengaged	99%
Concerned	81%	Doubtful	63%
Cautious	79%	Dismissive	88%

In December 2009 and January 2010 a random sample of 382 adult (aged 18 and older) visitors to the Science Museum of Minnesota were given the short form of the Six Americas instrument. To monitor for changes in SMM visitors' attitudes toward global warming, we ran a second round of data collection in January and February 2011 with a smaller sample (n=100). Chi-squared analysis between SMM data from 2010 and 2011 were statistically undistinguishable so data were combined for reporting purposes. Demographic and psychographic information (e.g., age, gender, ethnicity, interest in science, etc.) were collected from participants in addition to the base questions. At first, researchers read the questions to visitors, but quickly switched to allow visitors to complete the questionnaire by themselves. In addition to being a more efficient data collection method, it afforded visitors greater anonymity when answering potentially sensitive questions. After visitors had given consent to participate in

the survey, they were read the following statement that also appeared in writing at the beginning of the original survey.

Recently, you may have noticed that *global warming* has been getting some attention in the news. Global warming refers to the idea that the world's average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world's climate may change as a result.

At the time these data were collected, no exhibits on display at The Science Museum of Minnesota specifically addressed global warming.

Results

Although Science Museum of Minnesota visitors may be more educated than the general public, they are highly similar to the general public in terms of their attitudes toward global warming (Figure 1). The main differences between SMM visitors and the general public are between proportions of people with disengaged and dismissive attitudes. Fewer SMM visitors are disengaged, but more are dismissive than in the general public. However, the overall sample of SMM visitors is statistically indistinguishable from the larger population. To track change over time, Leiserowitz, Roser-Renouf, and Maibach (2010) collected another round of global warming attitudes at the same time as this study was underway; SMM data were statistically indistinguishable from either set.

Beyond computing the proportions of six Americans in the Science Museum's visiting population, we checked for possible correlations between visitors' global warming attitudes and their demographic and psychographic characteristics (age, interest in science, educational attainment, ethnicity, membership status, income, gender, and number of museum visits). The only statistically significant correlations were between Alarmed visitors and Concerned and Cautious visitors and their reported interest in science. Alarmed visitors reported higher levels of interest in science than the Concerned and Cautious visitors. Otherwise, no significant

correlations between visitors' global warming attitudes and their demographic or psychographic characteristics were found.

Six Americas Results

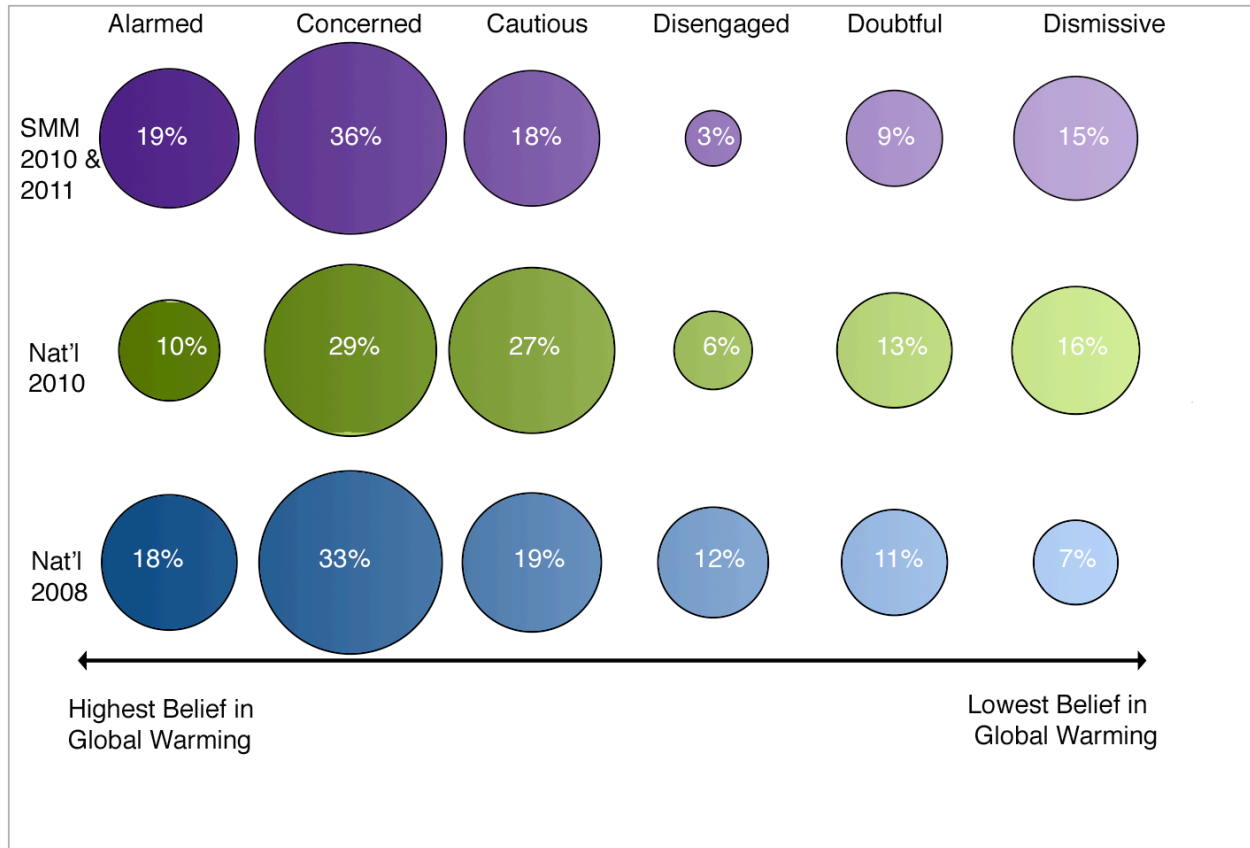


Figure 1: Comparison among Science Museum of Minnesota visitors and the general public's global warming attitudes in 2008 and 2010. Data sources Yale Project on Climate Change (Nat'l 2008 & 2010), Science Museum of Minnesota (SMM 2010 & 2011). *Based on chi-squared analysis, there is no statistical difference among the samples.

Discussion

Science Museum of Minnesota found no significant differences between its visitors' attitudes toward global warming and those nationally. We interpret our results to indicate that efforts to inform U.S. citizens about global warming would benefit from the involvement of science museums. Millions of Americans visit these institutions annually, and they are trusted sources

of information (Lake, 2001). Because the global warming attitudes of these visitors, at least at SMM, closely track those of the national population as a whole; science museums would be a worthwhile venue for more opportunities to learn about global warming. Although our sample was large for museum evaluation standards, and large enough to allow for meaningful statistical comparison (n=482), it was still much smaller than the samples taken by Maibach et al. (2009) and Leiserowitz et al. (2010). With a larger sample (and with the full suite of questions), it is possible that statistically significant differences would emerge. Additionally, this study was conducted at one science museum. We encourage other science museums to consider replicating our study. This would allow for a more robust comparison to the national results and for comparison among science museums. If you are interested in replicating this study at your museum, please contact Phipps to discuss details.

References cited

- Lake, Snell, Perry & Associates. (2001). *Americans Identify A Source of Information They Can Really Trust*. Washington DC: American Association of Museums.
- Maibach, E., Roser-Renouf, C., & Leiserowitz, A. (2009). *Global Warming's Six Americas 2009: An Audience Segmentation Analysis*. Yale Project for Climate Change and George Mason University Center for Climate Change Communication.
<http://environment.yale.edu/uploads/SixAmericas2009.pdf>
- Leiserowitz, A., Maibach, E., & Roser-Renouf, C. (2010). *Global Warming's Six Americas, January 2010*. Yale University and George Mason University. New Haven, CT: Yale Project on Climate Change.

Contact information

Molly Phipps, Ph.D.
Senior Evaluation and Research Associate
Department of Evaluation and Research in Learning
651- 221-4570
mphipps@smm.org



This study made possible with support from the National Science Foundation. Any opinions, findings, and conclusions or recommendations expressed in this study are those of the author and do not necessarily reflect the views of the National Science Foundation.