



Aspen Global Change Institute Energy Project

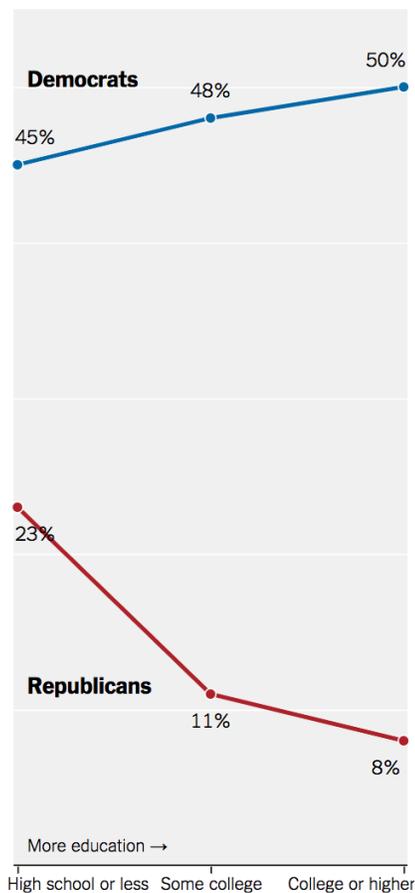
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Can Education Make Polarization on Scientific Topics Worse?

In recent years, public opinion polling in the U.S. has revealed startling partisan and ideological divides on topics where scientific consensus is relatively strong. Some of this data has revealed a counterintuitive connection with education level. As a recent example, Gallup data reported in [a New York Times article](#) indicates that worry about climate change increases with higher education level among Democrats but *decreases* with higher education levels among Republicans (see right). This kind of data provokes many questions about what strategies work for building public support for policy solutions that could address problems like climate change. For instance, results like this run counter to the general presumptions that more information or education on a topic will lead to changed behaviors or to greater convergence in belief about scientific topics.

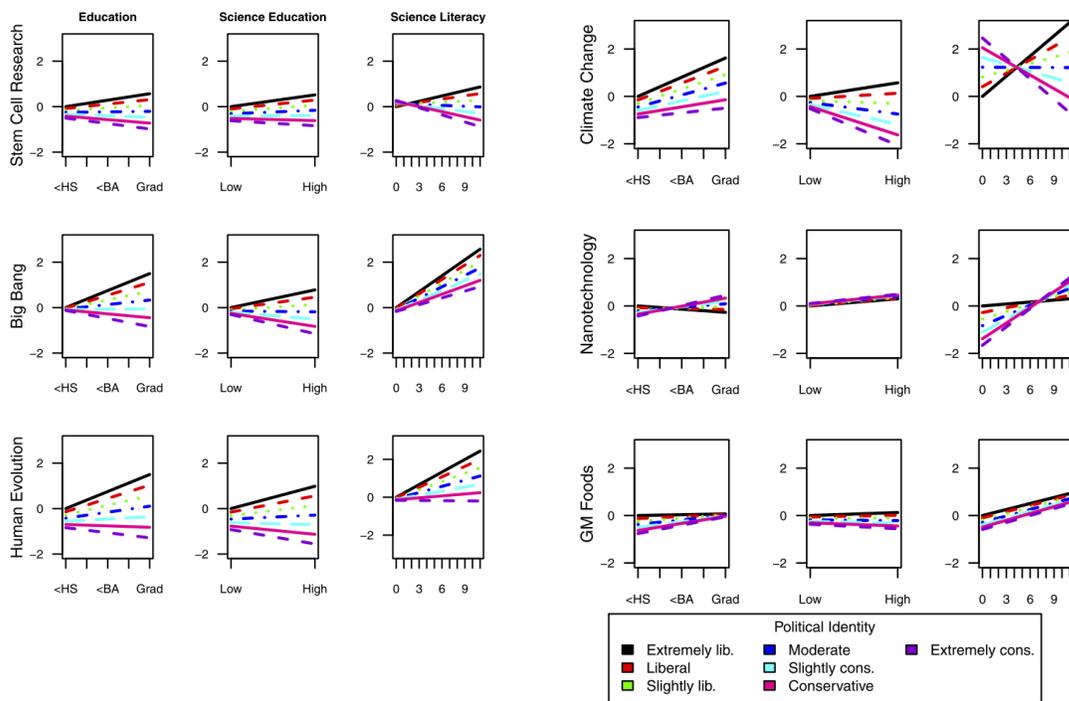
A new study published in *The Proceedings of the National Academy of Sciences* by Caitlin Drummond (University of Michigan) and Baruch Fischhoff (Carnegie Mellon University) offers an expanded way to examine this problem using survey data from 2006 and 2010. In their paper titled, "Individuals with greater science literacy and education have more polarized beliefs on controversial science topics," the

Percent saying they worry about climate change "a great deal"



authors analyze viewpoints on six controversial scientific topics: stem cell research, the big bang, human evolution, climate change, nanotechnology, and genetically modified (GM) food. The paper is important because it goes beyond public opinion polling on particular topics like climate change that may not be generalizable to other scientific issues. It also captures a wider range of respondent characteristics such as levels of *science* education and an index-based measurement of science literacy.

The authors find a so-called “funnel” effect is consistently demonstrated in public perception about most other scientific topics, with the exception of genetically modified foods. That is, the effect of increasing education level, science education, and science literacy leads to either greater divergence or persistent gaps in attitudes between respondents with different ideological views. What is perhaps more striking is that this funnel appears not just in general education level but also frequently with the level of science education level and science literacy. In the figure below, higher values on the vertical axis represent viewpoints closer to scientific consensus.



The results from Drummond and Fischhoff lend support to two behavioral science theories for why more knowledge does not necessarily change individual opinions. The first is an idea about motivated reasoning, which suggests that individuals with more knowledge are better able to interpret evidence in support of their preferred conclusions. As the authors write, “better educated people are more likely to know when political or religious communities have chosen sides on an issue, and hence what they should think (or say) in keeping with their identity.” Another explanation is the

miscalibration explanation, which theorizes that when individuals are exposed to new knowledge, their confidence increases faster than their actual knowledge. When we see stronger views expressed by the most ideological position (e.g., climate change), it's possible we are seeing an interaction between the effects of miscalibration and motivated reasoning.

The authors are careful to point out that these results do not suggest a causal connection between education and polarization, so these should not be interpreted to suggest that education itself is the root of the problem. Indeed, upward sloping trends among all ideological groups occur for nanotechnology, GM foods, the big bang, and human evolution, suggesting education does have some effect on beliefs regarding scientific topics. Yet, the divergence between ideological positions is still striking for all but GM foods where perhaps ideological positions are less well known or consistent. A more appropriate interpretation is that education alone may not be able to overcome the influence of ideological or religious leaders on the most controversial scientific topics. One silver lining in these results is the expectation that as religious and ideological leaders take positions on issues that are in keeping with scientific consensus (such as the Pope Francis' 2016 encyclical), we can expect beliefs to change and for them to change more strongly with more science literacy and education.

Drummond, C and B Fischhoff. 2017. "Individuals with Greater Science Literacy and Education Have More Polarized Beliefs on Controversial Science Topics." Proceedings of the National Academy of Sciences 114: 36.