

How Can I Help? Evidence of Changing Student Attitudes About Climate Change at a Private Four-Year Liberal Arts College

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INTRODUCTION

I have long been interested in my students' preconceptions, attitudes, and opinions about climate change, and I have collected information from introductory-level students in my *Earth's Record of Climate* course (GEOL 162) over the past 15 years (Theissen, 2008; Theissen, 2011). Like the rest of the general public, students have been and continue to be subject to an unyielding campaign of misinformation about climate change. Nevertheless, over time **I have sensed a shift in the interests of students in my course from one where students place emphasis on scientific proof of human-induced climate change, to one of greater desire to explore and carry out solutions.** I have had clear examples of students expressing this in class, but is this anything more than just anecdotal? **With the most recent offering of my course, I wondered, have my students' opinions and attitudes truly changed in any way?** Here, I share some results of a qualitative study based on simple surveys given to students on the first day of my course.

A significant result from the surveys is that relative to previous cohorts, my most recent cohort of students (Spring 2019) came into the course with a greater sense of agency and many more questions about how they can help resolve the problem.

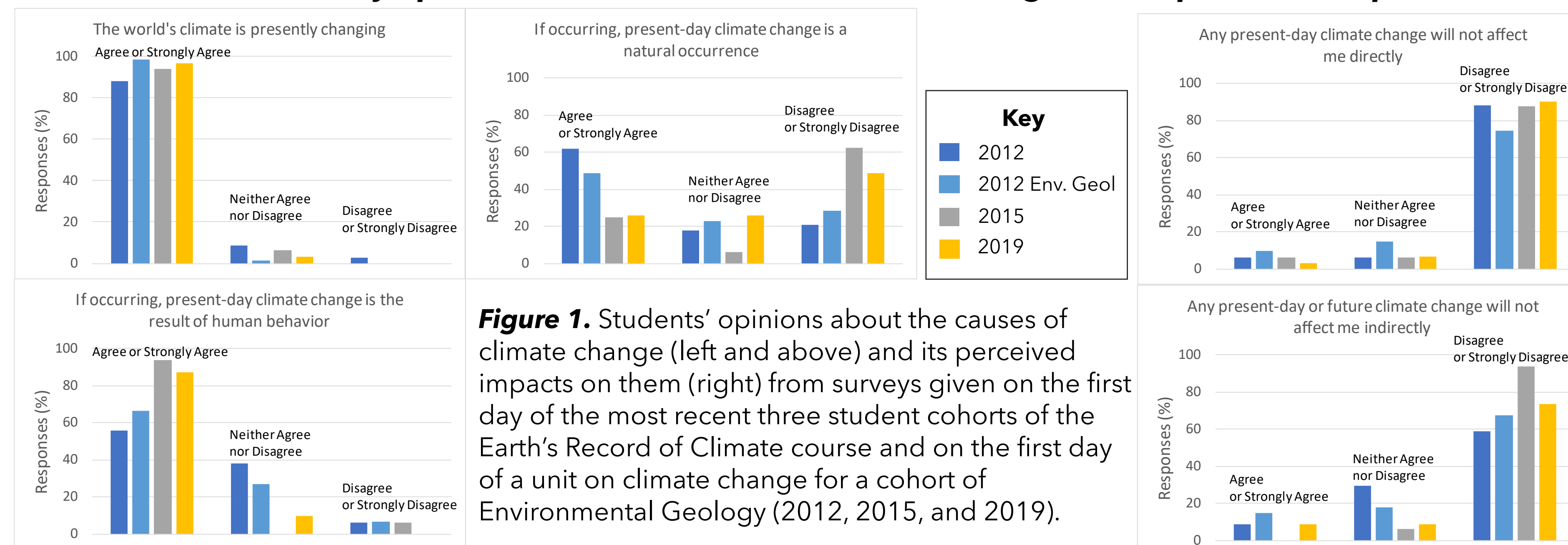
SURVEY METHODS

1. I administered a simple survey developed by a colleague, Dr. Stephen Tooth (Aberystwyth University, UK), on both the first and last day of The Earth's Record of Climate course for the last three offerings of the course (2012, 2015, and 2019; n = 34, 16, and 31 students respectively). Students were told that their response to the questions was optional and anonymous, but they were encouraged to participate. A colleague administered the survey with a larger section (n = 74) of another introductory level course, Environmental Geology, on the first day of their climate change unit during October, 2012.
2. Students enrolled in these introductory courses were consistently a mixture of all class years. A majority of students were not science majors.
3. Given the relatively small number of students involved, I view this as a qualitative rather than quantitative study.
4. The focus here, is on results of surveys administered on the first-day of class, prior to any instruction from me.
5. The survey is comprised of nine statements that ask for a five-level likert-scale response (Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree), one question that asks for a yes or no response, and two questions that ask for brief written responses. Each of the likert-scale questions also has a small "comments" area. The content of the surveys is given below:

1. *The world's climate is presently changing* [Likert]
2. *If occurring, present-day climate change is a natural occurrence* [Likert]
3. *If occurring, present-day climate change is the result of human behavior* [Likert]
4. *Any present-day or future climate change will not affect me directly* [Likert]
5. *Any present-day or future climate change will not affect me indirectly* [Likert]
6. *Other global issues are of more concern to me than climate change* [Likert]
7. *Climate change has become more of an issue for me in this last year* [Likert]
8. *I personally can help to limit the effects of climate change* [Likert]
9. *I have made lifestyle changes in response to climate change issues* [Likert]
10. *Has anything you have seen, heard or participated in during this last year changed your views about climate change?* [Yes/No]
11. *If yes, please could you describe this?:* [Written response]
12. *What are the first five terms or images that you associate with climate change?* [Written]
13. *What questions do you have about climate change? The questions you have will help us decide on future lecture and module content* [Written]

SURVEY RESULTS

Students' first-day opinions about the causes of climate change and its perceived impacts on them



Results of the survey indicate that a large majority of each cohort recognized that global climate change is occurring with a slight increase with each offering (Fig. 1). In contrast, there appears to have been a notable change in the percentage of students who came into the course recognizing that climate change is a result of human behavior, with only 56% and 66% agreeing with this idea in 2012 and >87% agreeing with this in the more recent cohorts (Fig. 1). A much higher percentage (62 and 49%) of students in the 2012 cohorts agreed with the idea that climate change is a natural occurrence than those in the more recent two offerings (<26%; Fig. 1). A large majority of each cohort recognized that climate change will directly affect them (>75%). A majority of each cohort also recognized that climate change will indirectly affect them as well, with a greater proportion in the more recent two cohorts (94% and 74% in 2015 and 2019 compared to 59 and 68% in 2012).

Students increasingly express their agency and desire to personally address the problem

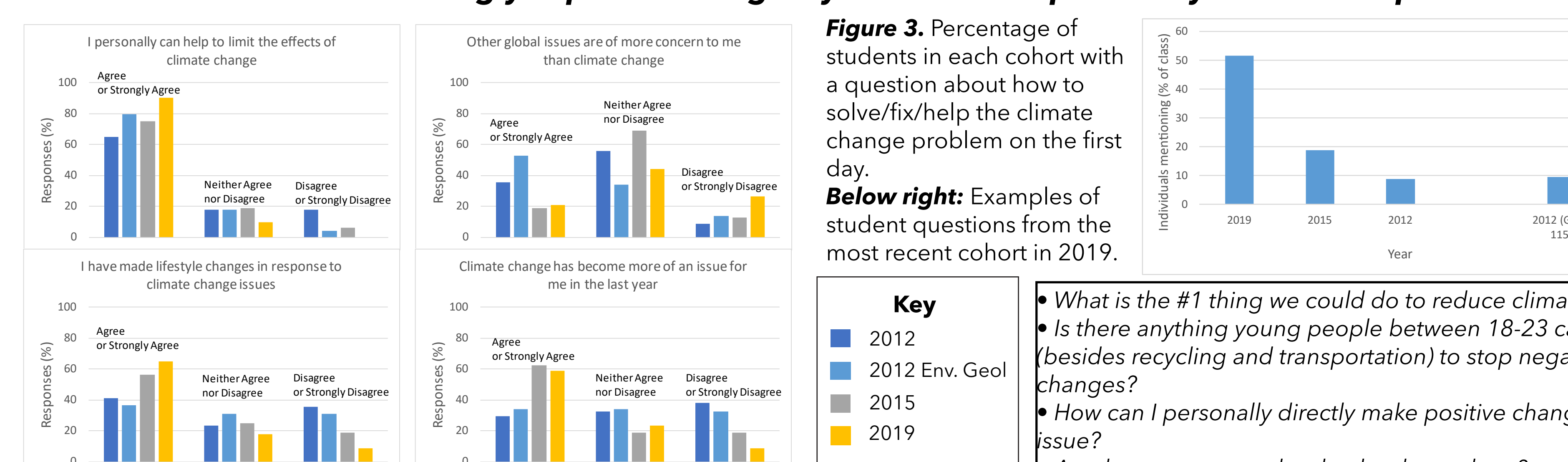


Figure 2. Students' opinions about their agency and the relative importance of climate change from surveys given on the first day of the Earth's Record of Climate course from the most recent three cohorts and the first day of a unit on climate change for a cohort of Environmental Geol.

On the first day of class, a majority of each surveyed cohort has agreed that they can personally help to limit the effects of climate change. The percentage increased from 65% and 79% in the 2012 cohorts to 90% in 2019 (Fig. 2). There has been a notable increase in the percentage of students who agree that they have made lifestyle changes in response to climate change issues, rising from 36 and 41% in 2012 to 65% in 2019 (Fig. 2).

The relative importance of climate change to students appears to have changed as well. The majority of each cohort either gave a neutral response or agreed when asked whether other global issues were of more concern to them than climate change. However, the percentage of students giving a neutral response in the 2019 cohort declined, with more of these students disagreeing with it than other cohorts. Students in the most recent two cohorts agreed that climate change had become more of an issue for them in the last year at a significantly higher percentage (59 and 62%) than those in the 2012 cohorts (29 and 34%) (Fig. 2).

The final question on the first-day survey invites students to submit their questions about climate change. An important change is the large increase in the percentage of 2019 students whose written response was a question asking how they could help, fix, or solve the problem of climate change (Fig. 3). Just over half of the students did so in 2019 while < 10% did so in the 2012 cohorts. In comparison, other questions from students such as, "Is climate change real", "Is climate change an important issue/something to worry about?", or "Are humans causing/how much is natural versus human?" show insignificant differences (6% or less) between cohorts.

DISCUSSION: STUDENT THOUGHTS ABOUT THE SURVEY RESULTS

I find these results encouraging, especially in the current U.S. political situation where climate science is under increased attack and suppression. To better understand my 2019 students' clear shift towards expressions of greater agency and a desire to help with the climate issue, I shared the data with them, and asked them what they thought had changed since 2012 that might account for the change. Here are some of their thoughts:

- A student suggested that there is "more open dialogue now" about the topic of climate change. Another student added to this by saying that it has become a more "comfortable" discussion topic, even "cool" to discuss with peers.
- A student said that a possible reason is that "social activists are stepping up on a range of issues." Another student followed on this saying that peers are getting involved and pointed out that college-aged students in particular are active. This student pointed to articles in *Vice News* that suggest a 12-year window to address the issue.
- A student said that "We are seeing big changes." This student mentioned climate-related policy change in Atlanta as an example.
- In one exchange, a student said that this is a problem young people need to solve. When I pushed back against this idea and suggested that perhaps the older generations should be just as involved, the student suggested that resolution of the problem is "...more important to us"

SUMMARY and CONCLUDING THOUGHTS

Students increasingly enter my introductory-level course believing that humans are causing climate change and that it will directly and indirectly affect them.

Additionally, they increasingly enter the course believing they have greater personal agency with regard to the problem and more of them indicate that they have made changes in response to it.

My most recent cohort of students showed an important increase in another indicator of their personal agency with regard to action on climate change. There was a big jump in the number of questions from students about helping to fix, solve, or reduce the rate of climate change.

I have placed greater emphasis on climate change solutions in my course over time, and these survey results suggest that I should do more. One option might be to perhaps incorporating a project in which students carry out a carbon footprint reducing step on campus or in a local community.

I will continue to gather survey data at my home institution. If you are interested in using the same survey, let me know!

REFERENCES
Theissen, K.M., 2011. What do U.S. students know about climate change? *EOS Transactions*, 92, 477-478.
Theissen, K.M., 2008. The Earth's Record of Climate: A focused-topic introductory course in paleoclimatology. *Journal of Geoscience Education*, 56, 342-353.