

What Can We Do? An Exploratory Study on Undergraduate Student Climate Change Perceptions

Walker J. Skeeter^{1*}, Jacob R. Reed², Jordan R. Cissell², Riffat Islam², David J. Keellings²

¹University of Delaware, Department of Geography and Spatial Sciences, 216 Pearson Hall, Newark, DE 19716

²University of Alabama, Department of Geography, Box 870322, Tuscaloosa, AL 35401

*Corresponding author: wskeeter@udel.edu

ABSTRACT

A survey was conducted to evaluate the perceptions of undergraduate students enrolled in an introductory atmospheric processes course towards various climate change related topics, such as the validity of, and the scientific consensus surrounding climate change. Further questions sought information regarding student knowledge of climate change, such as when they were first exposed to the science, and their methods of seeking out information regarding climate change. This study additionally seeks to identify sectors of the human and natural world that students feel climate change negatively affects. Results indicate that students desire information about mitigation strategies, regardless of whether they believe humans are the leading cause of climate change. Additionally, students must be made more aware of the non-natural impacts of climate change (infrastructure, economy, etc.). These findings can help instructors enrich course content to include topics relevant to student concerns regarding climate change, particularly its adverse impacts, and mitigation strategies.

Key Words: climate change, risk perception, survey, undergraduate, education

INTRODUCTION

Anthropogenic climate change will result in overwhelming consequences if left unchecked (IPCC 2014). Continued public debate about the validity and consequences of anthropogenic climate change, despite overwhelming support of these ideas within the scientific community demonstrates the need for further research into the relationships between scientific understanding, communication, and public opinion. What are viable strategies for communicating science to people who may have difficulty understanding or relating to it? Where are individuals within the general public receiving the bulk of their climate related information? There is unequivocal evidence supporting an unprecedented warming trend of the climate system in recent decades (IPCC 2014). Despite the conclusions of the scientific community, many people encounter difficulty in understanding both short-term and long-term effects of climate change due to the complex nature of the science underlying these processes (Aksit et al. 2017). It has been shown that even some highly educated adults possess scant understanding of global climate change and its impacts

(Sterman & Sweeney 2007). Recent research indicates that only 60% of Americans think scientists agree that climate change is occurring and that humans are driving that change, and less than 40% of people think that climate change poses a serious threat to their own lives (National Science Board 2016).

Public perception of climate change has been the subject of many recent studies. Guy et al. (2014) investigated the influence of proxy measures of knowledge on climate change beliefs such as whether climate change is occurring, if it is human caused, and whether it has negative consequences in a national sample of the Australian public, concluding that the reality of climate change is well accepted among the people possessing accurate information, but not amongst those who are ill informed. Reynolds et al. (2010) discussed a dramatic change in public understanding of climate change over the past decade, showing improved understanding of broad causes and effects of climate change. Public opinions and perceptions towards climate change obtained for different nations tend to vary before and after significant weather-related events, and

have fluctuated over time, recently marked by an uptick in skepticism in many developed nations in the late 2000's, while conversely greater concern is shown regarding climate change in other areas (Capstick et al. 2015). Political leanings, particularly in the United States significantly influence people's views on the validity of, and subsequently towards policies to address climate change. Recent research revealed that about 83% liberal democrats believe "Earth is getting warmer mostly because of human activity." Conversely, only 18% of conservative republicans believe the same, while 46% of conservative republicans claim earth's warming trend is a natural phenomenon, with 36% saying there is no solid indication of global warming (Funk et al. 2018). While several factors appear to influence climate change perception, skepticism and polarization have both increased during mid to late-2000s, particularly in the United States, despite increasing scientific certainty on the issue (Guy et al. 2014).

Moving beyond perceptions, it is necessary to encourage productive public discourse regarding climate change, as discussion and the presentation of both facts and ideas is an effective way for the general public to both understand the science of climate change, its inherent impacts, and ways to combat them. Swim, Fraser, and Geiger (2014) argue that a primary factor behind a lack of understanding related to climate change, both scientifically and socioeconomically, is a general lack of public discourse on the topic, which prevents information consumption by the general public. This lack of public discourse is likely related to the unfortunately politicized nature of the topic. The political nature of climate change discussion has increased over recent decades as was highlighted above, and according to Leiserowitz et al. (2013), discussions about the topic within the general public have decreased within the last decade, with only about one third of individuals regularly discussing climate change with friends or family.

Studies of climate change perceptions with regards to college students are of particular importance, since these individuals today are generally expected to have a reasonable grasp of the science behind climate change, as well as its socio-environmental impacts compared to previous generations, having grown up with greater exposure to these topics in both school and in the media (Aksit et al. 2017). Confusing climate change with other environmental issues is a common problem of undergraduate students however, which may cloud their understanding of mitigation practices (Huxter et al. 2015). Aksit et al. (2017) investigated how the climate change perception of college students is modified by several factors (e.g. content knowledge, political orientation, values etc.) and examined the impact of a semester long course on their content knowledge and risk perception, finding that increased exposure to climate change related education for current undergraduate students increases the perception of the risks associated with it, compared to previous generations that were given less exposure to these topics during their education.

This research evaluates climate change perceptions of undergraduate students enrolled in an introductory atmospheric processes course at a large public university in the Southeastern United States (University of Alabama) using a paper survey given during class. This survey places particular emphasis on evaluating student exposure to climate change information (both inside and outside of a school setting), their opinions on the scientific consensus surrounding climate change, and what impacts they believe climate change will create. Identifying potential knowledge gaps or misperceptions students possess and improving understanding about how student populations perceive climate change will help to enhance the communication of climate change science through tailoring instruction to best reach the undergraduate audience. In today's fast changing world, it is important to keep a firm grasp on how people access and consume information, so as to adjust to inevitable and potentially quick changes in those characteristics and reach them with accurate information more effectively. This study and studies like it (Boyes & Stanisstreet 1992; Lombardi & Sinatra 2012; Carlton & Jacobson 2013; Jamelske et al. 2013; McNeal et al. 2014; Nigatu et al. 2014), which place an emphasis on the interests and possible shortcomings of students, can help in these worthwhile pursuits. It is hoped that this study could serve as a framework for future research investigating climate change perceptions of students and help inform instructors of climate-related material in how to approach students who may have varying levels of knowledge of or misperceptions about climate change. As such, the survey utilized for this research has been included as an appendix, and readers/instructors are encouraged to utilize it for their own benefit.

METHODS

Survey Design

Numerous climate change survey questionnaires have been created to assess opinions and perceptions of different study groups. It has been shown that the design of climate change questionnaires (i.e. inclusion of partisan or leading questions) can have a significant effect on the responses obtained (Schuldt, Roh, and Schwarz 2015). Here, the survey was constructed in such a way that it could be taken in its entirety both by students who agree with the conclusion of scientists that anthropogenic climate change is happening and students who may doubt the validity of these claims. The questions were written using impartial language in an effort to ensure a high completion rate.

The paper survey consisted of 5 demographic questions, 3 climate change related educational background questions, and 15 general opinion questions. 12 of the 15 opinion questions were closed-ended, two questions were close ended response with the option of a free-response for additional clarification. The purpose of the final free-response question was to gain insight into specific questions students may have on the subject of climate change.

Participants

164 undergraduate students enrolled in six Introduction to Atmospheric Processes lab sections were solicited to participate in this study. Student enrollment in this lab is required in conjunction with enrollment in the regular lecture class of the same title. This lecture/lab course is a popular undergraduate class and can be taken for credit toward the required natural science concentration of the university’s core curriculum. These six lab sections were taught by two of the authors of this paper and represent approximately 18% of the total number of students (N=920) enrolled in all sections of the course that semester. 89% (N=146) of students enrolled in the six lab sections participated in the survey. 81.5% of participants (N=119) answered every question of the survey. Completion rates for each question are presented in Table 1. Descriptive statistics for each question were calculated using the respective *n* value for that particular question. For example, the reported percentage of male respondents was calculated as a percentage of 142, while the race/ethnicity percentages were calculated as a percentage of 137 (Table 1). Participants reported their academic majors in an open response format, furnishing answers of varying terminology and specificity. Prior to calculating descriptive statistics, participants’ academic major responses were coded into one of the following eight exhaustive and mutually exclusive groups: *arts, business, education, engineering, geography or environmental science, social science, social work, or undeclared*.

Table 2 summarizes basic demographic information of the survey respondents. 55.6% of participants identified as female, 43.7% identified as male, and 0.7% identified as gender fluid, closely aligning with the 56.3% female and 43.7% male campus-wide undergraduate enrollment reported for the fall 2017 semester by the University of Alabama’s Factbook (OIRA 2018). White students were disproportionately represented in our respondent pool relative to the university’s undergraduate student body, with 90.4% white respondents compared to 76.61% white enrollment in fall 2017 (OIRA 2018). 25.9% of respondents were in-state students, compared to 41.4% for the undergraduate student body (OIRA 2018). 20 other states were represented in this study. The majority of respondents were business majors (63.0%), with only 4.3% of the participant pool identifying as geography or environmental science majors.

Survey Procedures

Paper surveys were distributed in class over the course of two weeks. The surveys were issued by another member of the Department of Geography who had no influence over the student’s grades. The instructors of the lab sections were not in the classroom while the students completed the survey. This was done to avoid students feeling pressured into taking the survey, as their participation was optional.

Table 1. Number of responses received for each survey question. Percentage column represents percent of total 146 respondents that answered each question.

Question	Number of Responses	Percentage
Age	142	97.3%
Gender	142	97.3%
Race	137	93.8%
Zip Code	135	92.5%
Major	138	94.5%
Background 1	145	99.3%
Background 2	135	92.5%
Background 3	25	17.1%
Question 1	144	98.6%
Question 2	144	98.6%
Question 3	145	99.3%
Question 4	142	97.3%
Question 5a	146	100.0%
Question 5b	88	60.3%
Question 6	145	99.3%
Question 7	141	96.6%
Question 8	146	100.0%
Question 9	145	99.3%
Question 10	145	99.3%
Question 11	145	99.3%
Question 12a	146	100.0%
Question 12b	52	35.6%
Question 13	145	99.3%
Question 14	144	98.6%
Question 15	51	34.9%
<i>Total Number of Respondents = 146</i>		

RESULTS

Student perceptions of climate change and related topics is information not readily available to instructors of courses which cover those subjects. Results of this survey indicate that more than 90% of respondents have learned about climate change in a school setting, with most of them being introduced to the topic in middle school (Table 3). Figure 1 shows that approximately 57% of those respondents who had not formally learned about climate change indicated that they were interested in doing so. As was previously mentioned, only

Table 2. Demographic summary of survey respondents' race/ethnicity, gender, age, and major.

Race/Ethnicity	n	Percentage
White	124	90.5%
Black	7	5.1%
Hispanic/Latino	3	2.2%
Asian/White	2	1.5%
Asian	1	0.7%
Gender		
	n	Percentage
Female	79	55.6%
Male	62	43.7%
Fluid	1	0.7%
Age		
	n	Percentage
18	17	12.0%
19	51	35.9%
20	47	33.1%
21	19	13.4%
22	7	4.9%
51	1	0.7%
Major		
	n	Percentage
Business	87	63.0%
Social Science	16	11.6%
Engineering	11	8.0%
Arts	8	5.8%
Education	8	5.8%
Geography/Enviro. Sci.	6	4.3%
Social Work	1	0.7%
Undeclared	1	0.7%

4.3% of participants identified as geography or environmental science majors. It is believed that this makes the survey more representative of the greater campus community, as ES/geography majors, along with representing only a small portion of a

Table 3. Summary of when respondents first learned about climate change in a school setting.

Have you learned about climate change in a school setting?	n	Percentage
Yes	131	90.30%
No	14	9.70%
If yes, approximately when did you first learn about climate change?		
	n	Percentage
Elementary	27	20.30%
Middle	58	42.90%
High	37	27.10%
College	13	9.80%

typical campus's student population, would not only have more inherent interest in climate change, they would also likely have higher base knowledge than a typical student. Television and internet/social media represented the most prevalent sources of climate change information for respondents, with 86.2% citing the internet or social media, and 77.2% listing television as a source of information ($n = 145$). School coursework appears to also be an important source of climate change information for those surveyed, with 72.4% of respondents indicating that school coursework has informed their current thoughts (Fig. 1). Indeed, all three of the respondents who selected "Other" for this question specifically credited an individual professor or course with informing their current opinion.

Of students surveyed, 95.1% ($n = 144$) believe that Earth's climate is changing (Fig. 2), a result that exceeds the findings of some previous studies in that regard, with Leiserowitz, et al. (2010) finding a figure of only 63% of respondents that believe global warming is happening, and a 2016 National Science Board study finding a figure of 59% of respondents at least "very sure" that global warming is occurring. This difference may be due in part to differing semantics however, as this study uses the term "climate change" rather than "global warming". It is important to note that 30% of the students who answered that they believed the climate is changing said they have at times doubted whether or not this is true. Perspectives on human culpability and responsibilities with respect to climate change reveal noteworthy results. While an overwhelming majority of respondents believe that humans are contributing to climate change (93.0%), only 58.6% of respondents believed that humans are the leading cause of climate change, a result that again exceeds the aforementioned 2016 National Science Board study (45%). Still, 87.3% of respondents felt that humans should take action to mitigate the effects of climate change. Indeed, approximately 70% of those

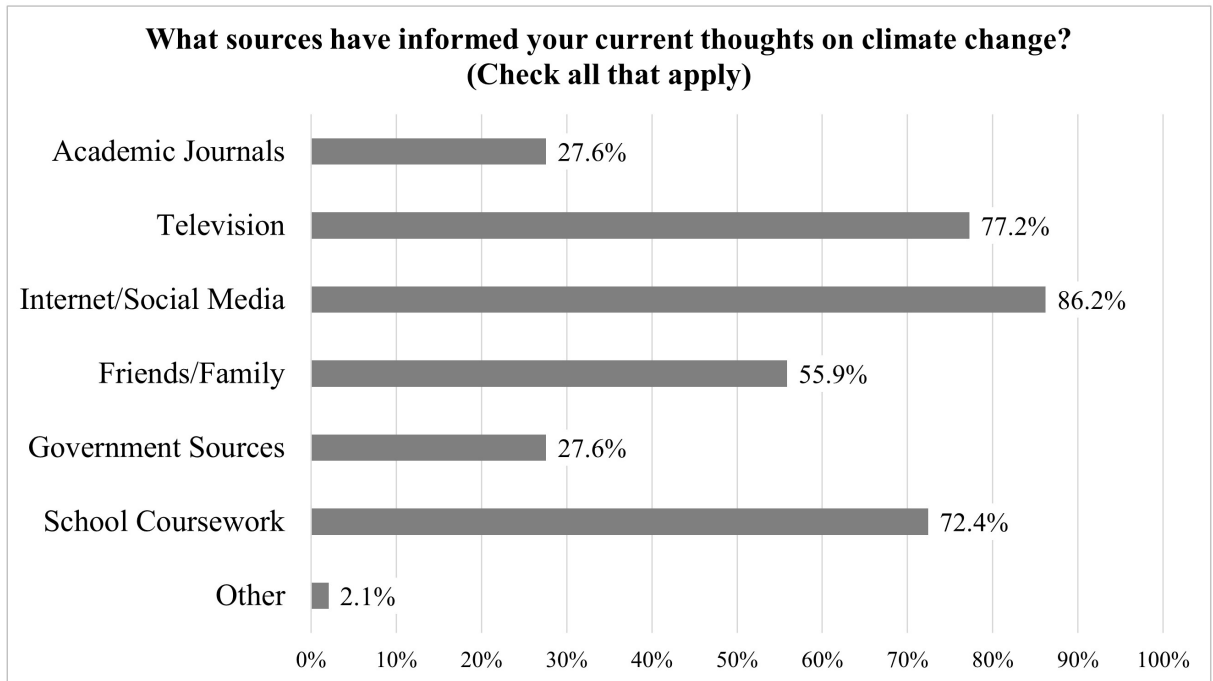


Figure 1. Summary of the sources that respondents have utilized to form their current opinions regarding climate change.

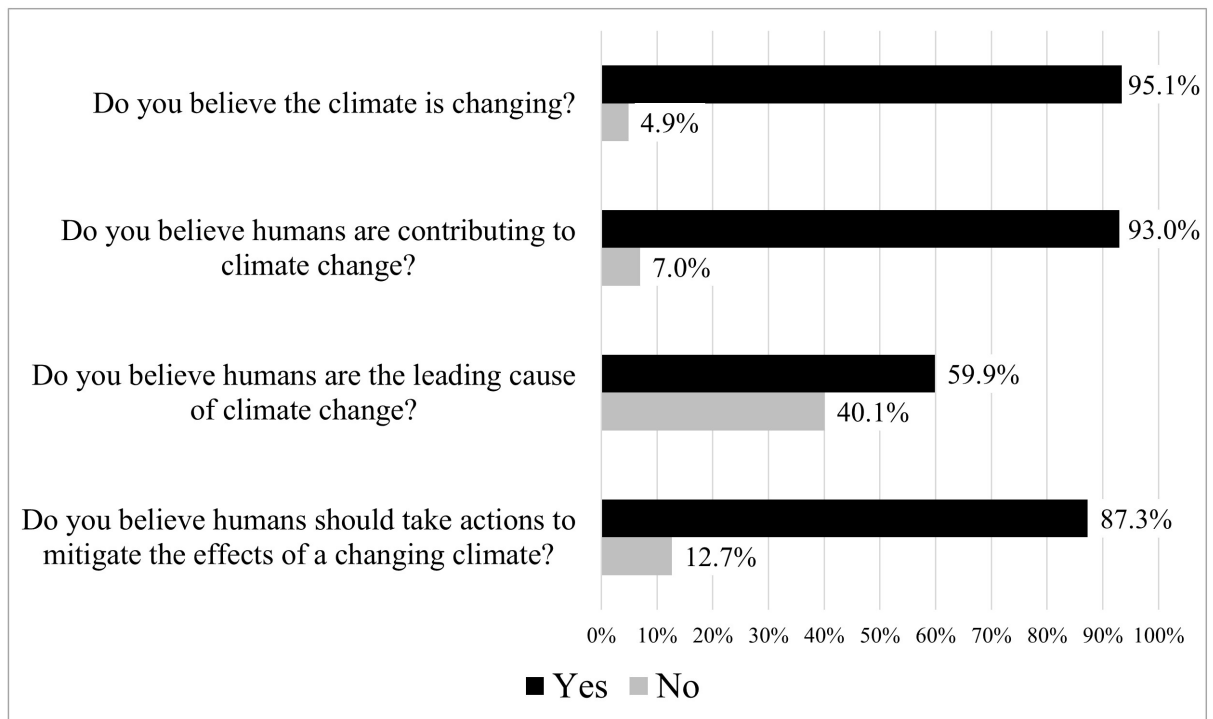


Figure 2. Respondents beliefs regarding the existence of climate change, human contribution to climate change, and whether they feel humans should take actions to mitigate its effects.

students who did not feel that humans were the leading cause of climate change nevertheless asserted that humans should play a role in counteracting its effects. This reveals an interesting and very important dynamic that suggests that regardless of whether the individuals surveyed believe that humans are the root cause of climate change, they likely still believe that we have a responsibility to fight the negative impacts.

Personal experience played a notable role in influencing respondents' opinions. Of the 88 respondents who provided open responses to Question 6, explaining why they had or

had not ever doubted that Earth's climate was changing, 16 respondents (~18%) directly referenced personal observations as the reason for their opinions. One respondent doubted climate change "because it is not something that you can just see or easily determine." Another did not experience doubt "because [they] see it in day to day life right in front [sic] of [their] eyes."

Respondents were asked about the "scientific consensus" surrounding climate change, or the oft referenced claim that 97% of climate scientists agree that climate change is occurring, and

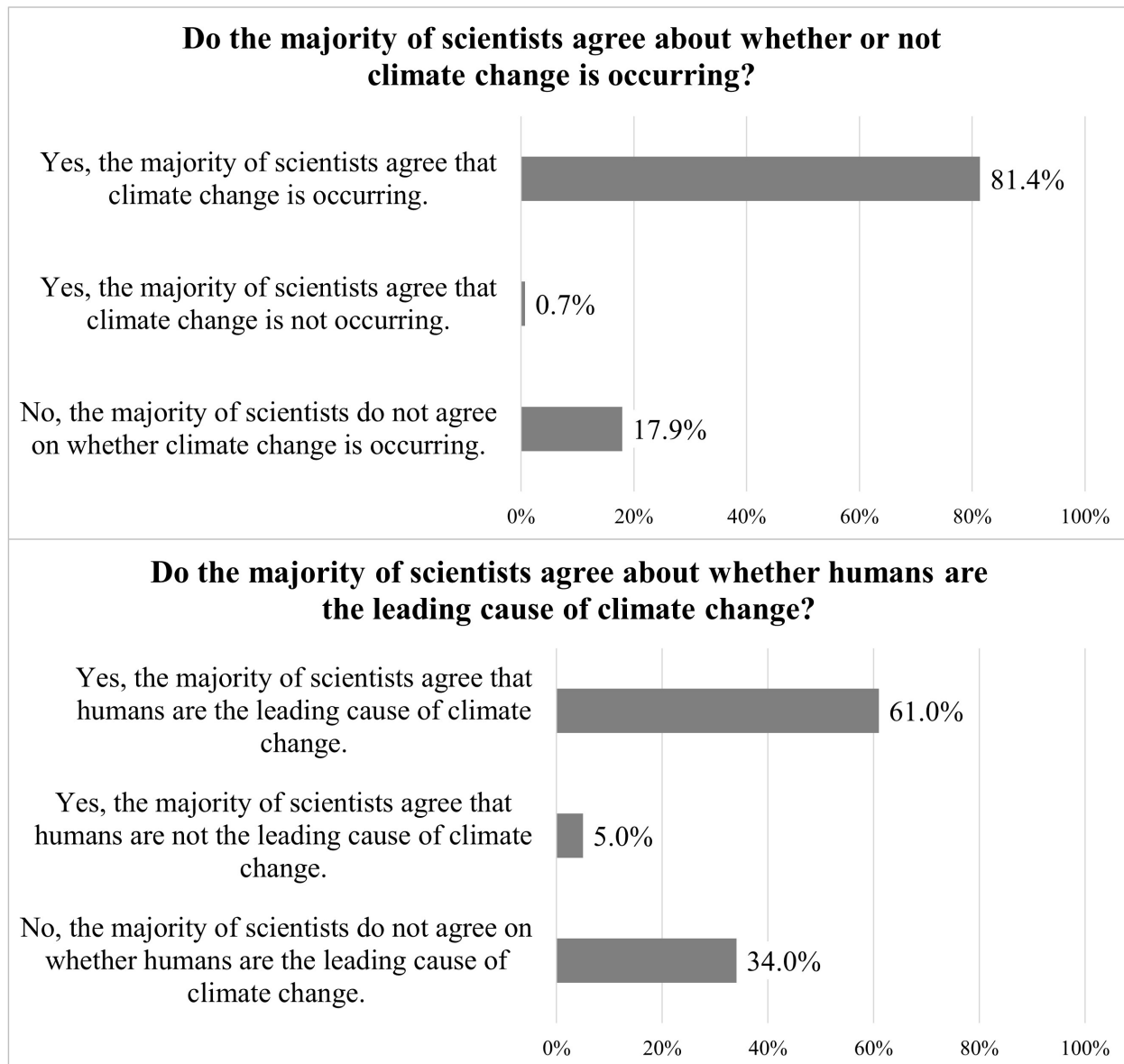


Figure 3. Respondent opinions regarding the scientific consensus surrounding climate change, as well as the impact of humans on the phenomena.

that humans are primarily responsible for it (Fig. 3) (Cook, et al. 2016). When asked whether the majority of scientists agree whether or not the climate is changing, 81.4% of students indicated that they believed that the majority of scientists agree that climate change is occurring, while 17.9% of students stated that they believed that the majority of scientists do not agree on whether climate change is occurring. These numbers shift further towards skepticism when the question is altered to include the aspect of human influence on climate change. When asked if the majority of scientists agree whether humans are the leading cause of climate change, 61% of respondents indicated that the majority of scientists do agree with this claim, while 34% indicated that the majority of scientists do not agree that humans are the leading cause of climate change, which overlaps well with the aforementioned National Science Board study, which found that 60% of their respondents also believed that scientists were not in agreement that humans are the leading cause of climate change. Also of note, five-percent of respondents indicated that they believe that the majority of scientists agree that humans are not the leading cause of climate change, which possibly shows a general lack of immersion in

the subject matter by these respondents.

When asked how serious of an issue they believed climate change to be using a Likert scale ranging from “not serious” to “extremely serious”, responses followed a general bell curve pattern, with a skew towards greater seriousness (Fig. 4). The majority of respondents believed that climate change is a “moderately” serious issue (38.6%), while 41.4% of respondents classified climate change as either “very” (26.9%) or “extremely” (14.5%) serious, indicating that a majority of students surveyed are at least somewhat concerned about the effects of climate change.

Figure 5 shows what sectors respondents feel could be adversely affected by climate change. Respondents could select as many sectors as they liked. More than 90% of respondents believe that climate change is a concern for the natural resources and ecosystem sectors (Fig. 5). These were the expected results, as these sectors are intuitively linked directly to the climate, however a particularly surprising result is that only 16.7% of respondents felt that climate change could pose issues for national security. Further, only 53.5% of respondents felt that climate change is an economic concern. For both of

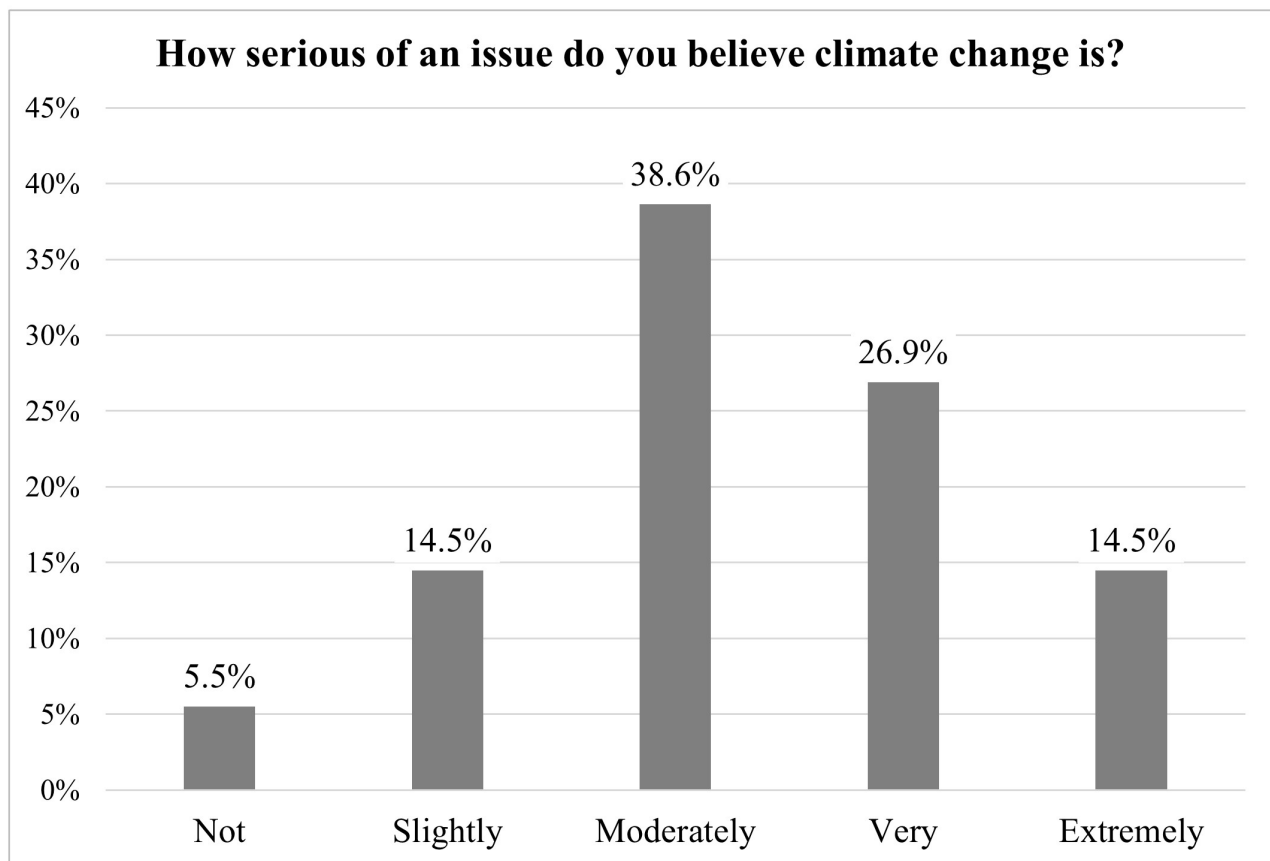


Figure 4. Respondent opinions regarding the seriousness of climate change.

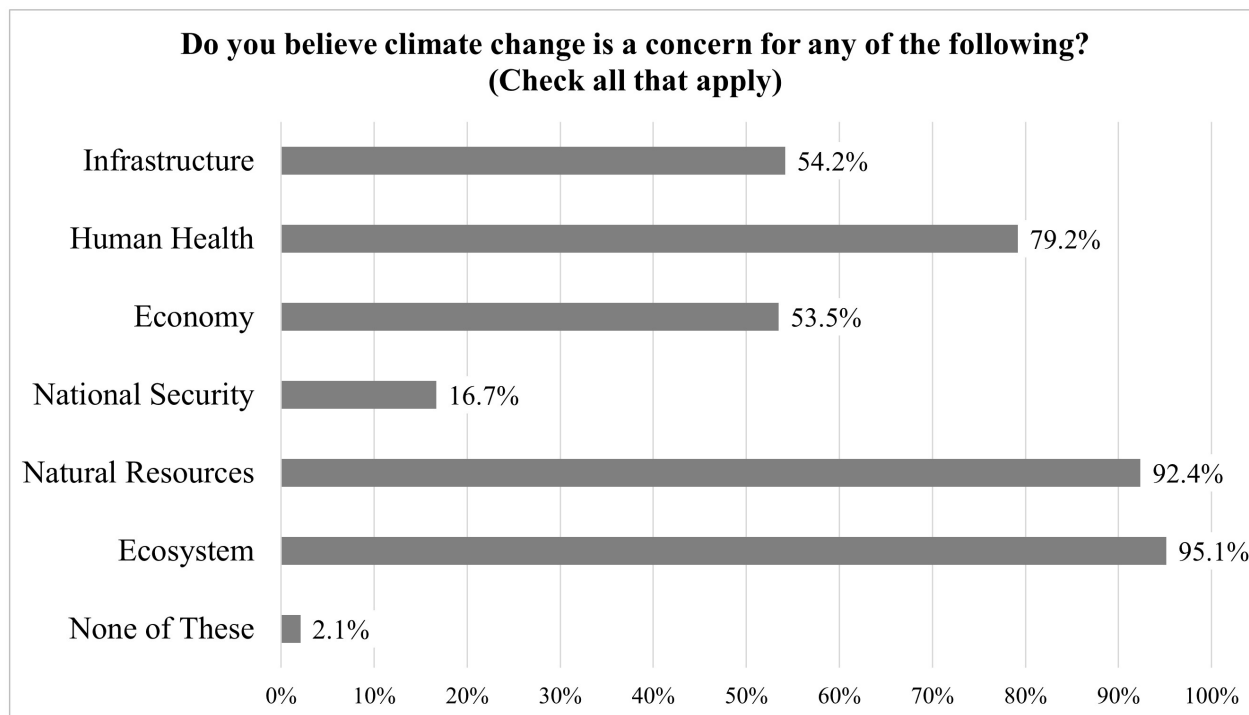


Figure 5. Summary of broad areas/sectors that respondents feel are placed at risk by climate change impacts.

these sectors, strains on resources likely to be influenced by climate change have the potential to create disproportionate socioeconomic strain that could certainly lead to varying degrees of conflict (Burke, Hsiang, and Miguel 2015). This would certainly be a useful perspective to integrate into future climate change education.

CONCLUSIONS

The findings of this survey suggest that students desire information about climate change mitigation strategies, regardless of whether they believe humans are the leading cause of climate change. This is evident by the fact that despite figure 2 showing that only 60% of respondents believe that humans are the leading cause of climate change, 87% of respondents believe that humans have a responsibility to mitigate the effects of a changing climate. Additionally, based on figure 5 it appears as though students must be made more aware of the types of hazards climate change creates across various sectors outside of the natural environment, such as infrastructure, the economy, and national security. If students are made more aware of how climate change will impact them, or at the very least other individuals, they may be more willing to learn about the mechanisms behind climate change, and potential mitigation strategies. Integrating abundant information about the adverse effects of climate change, both projected and ongoing, could prove useful in generating more interest in these topics

among undergraduates, and help reduce general skepticism. As an instructor, it is important to understand what aspects of climate change students are most often concerned about, and where gaps in knowledge or awareness may exist.

It is recognized that this study was conducted at a small scale. A primary objective of this exploratory study is to provide a framework for future questionnaires and surveys at other universities, which if conducted can help inform instructors on possible gaps in knowledge that may exist, and what aspects of climate change student populations are most concerned about or interested in. It would be interesting and useful to see how priorities, awareness, and skepticism vary regionally on college campuses. The authors encourage any interested parties to utilize the general framework and types of questions used for this survey (which is appended to this paper) for their own studies of climate change perceptions. Future studies should explore strategies utilized by instructors of climate change related courses, to improve effectiveness of instruction with respect to what students typically prioritize.

REFERENCES

- Aksit, O., A. McNeal, A. Gold, J. Libarkin, and S. Harris. 2018. The Influence of Instruction, Prior Knowledge, and Values on Climate Change Risk Perception among Undergraduates. *Journal of Research in Science Teaching* 55 (4):

- 550–72. doi:10.1002/tea.21430.
- Boyes, E. and M. Stanisstreet. 1992. Students' perceptions of global warming. *International Journal of Environmental Studies*, 42(4): 287–300. doi: 10.1080/00207239208710804.
- Burke, M., S. Hsiang, and E. Miguel. 2015. Global non-linear effect of temperature on economic production. *Nature* 1-5. doi:10.1038/nature15725.
- Capstick, S., L. Whitmarsh, W. Poortinga, N. Pidgeon, and P. Upham. 2015. International Trends in Public Perceptions of Climate Change over the Past Quarter Century. *Wiley Interdisciplinary Reviews: Climate Change* 6 (1): 35–61. doi:10.1002/wcc.321.
- Carlton, S. J. and S.K. Jacobson. 2013. Climate change and coastal environmental risk perceptions in Florida. *Journal of Environmental Management*, 130: 32-39. doi: 10.1016/j.jenvman.2013.08.038.
- Cook, J., N. Oreskes, P. Doran, W. Anderegg, B. Verheggen, E. Maibach, and K. Rice. (2016). Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. *Environmental Research Letters*, 1-7. doi:10.1088/1748-9326/11/4/048002.
- Funk, C., B. Kennedy, M. Hefferon, and M. Strauss. 2018. Majorities see government efforts to protect the environment as insufficient. *Pew Research Center*. May 2018.
- Guy, S., Y. Kashima, I. Walker, and S. O'Neill. 2014. Investigating the Effects of Knowledge and Ideology on Climate Change Beliefs. *European Journal of Social Psychology* 44 (5). Wiley-Blackwell: 421–29. doi:10.1002/ejsp.2039.
- Huxster, J., X. Uribe-Zarain, and W. Kempton. 2015. Undergraduate Understanding of Climate Change: The Influences of College Major and Environmental Group Membership on Survey Knowledge Scores. *Journal of Environmental Education* 46 (3): 149–65. doi:10.1080/00958964.2015.1021661.
- IPCC. 2014. Annex II: Glossary. *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*, 117–30. doi:10.1017/CBO9781107415324.
- Jamelske, E., J. Barrett, and J. Boulter. 2013. Comparing climate change awareness, perceptions, and beliefs of college students in the United States and China. *Journal of Environmental Studies and Sciences*, 3(3): 269-278. doi: 10.1007/s13412-013-0144-x.
- Leiserowitz, A., E. Maibach, C. Roser-Renouf, and N. Smith. 2013. Climate Change in the American Mind: Americans' Global Warming Beliefs and Attitudes in June 2010. Yale University and George Mason University. New Haven, CT: *Yale Project on Climate Change Communication*.
- Leiserowitz, A., E. Maibach, C. Roser-Renouf, and G. Feinberg. 2013. How Americans communicate about global warming in April 2013. Yale University and George Mason University. New Haven, CT: *Yale Project on Climate Change Communication*.
- Lombardi, D. and G.M. Sinatra. 2012. College Students' Perceptions About the Plausibility of Human-Induced Climate Change. *Research in Science Education*, 42(2): 201-217. doi: 10.1007/s11165-010-9196-z.
- McNeal, K. S., J.M. Spry, R. Mitra, and J.L. Tipton. 2014. Measuring Student Engagement, Knowledge, and Perceptions of Climate Change in an Introductory Environmental Geology Course. *Journal of Geoscience Education*, 62(4): 655-667. doi: 10.5408/13-111.1.
- National Science Board. 2016. Science and Engineering Indicators 2016. Arlington, VA: National Science Foundation (NSB-2016-1). [<https://www.nsf.gov/statistics/nsb20161/>]. Last accessed 12 January 2019.
- Nigatu, A. S., B.O. Asamoah, and H. Kloos. 2014. Knowledge and perceptions about the health impact of climate change among health sciences students in Ethiopia: a cross-sectional study. *BMC Public Health*, 14: 587. doi: 10.1186/1471-2458-14-587.
- Office of Institutional Research and Assessment (OIRA). 2018. Factbook: Student Enrollment. The University of Alabama. Retrieved from: <http://oira.ua.edu/factbook/contents/Student-Enrollment>.
- Reynolds, T., A. Bostrom, D. Read, and M. Granger Morgan. 2010. Now What Do People Know About Global Climate Change? Survey Studies of Educated Laypeople. *Risk Analysis* 30 (10): 1520–38. doi:10.1111/j.1539-6924.2010.01448.x.
- Schuldt, J., S. Roh, and N. Schwarz. 2015. Questionnaire Design Effects in Climate Change Surveys: Implications for the Partisan Divide. *Annals of the American Academy of Political and Social Science* 658 (1): 67–85. doi:10.1177/0002716214555066.
- Sterman, J., and L. Sweeney. 2007. Understanding Public Complacency about Climate Change: Adults' Mental Models of Climate Change Violate Conservation of Matter. *Climatic Change* 80 (3–4): 213–38. doi:10.1007/s10584-006-9107-5.

Walker Skeeter is a Ph.D. student in the Department of Geography and Spatial Sciences at the University of Delaware. His research interests lie primarily in hydroclimatology, with additional interests in atmospheric hazards and risk perception.

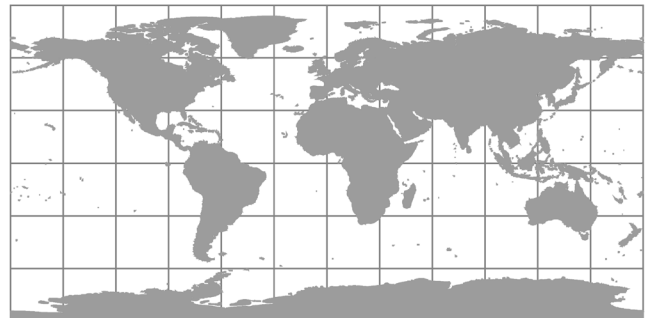
Jake Reed is a meteorologist and social scientist for the Center for Advanced Public Safety at the University of Alabama. His research interests include weather and hazard communication and disaster resiliency. He holds a graduate degree in Geography from the University of Alabama.

Jordan Cissell is a Ph.D. candidate in the Department of Geography at the University of Alabama. His research focuses on remote sensing and GIS applications for examining human-environment interactions in coastal and marine landscapes.

Riffat Islam is a Ph.D. student in the department of Civil Construction and Environment Engineering at the University

of Alabama. She works as a graduate research assistant for Alabama Transportation Institute. Her research area includes emergency evacuation of low-income population in time of disasters. She has a master's degree in civil engineering from the University of Alabama.

Dr. David Keellings is an Assistant Professor of Geography at the University of Alabama. He specializes in the climatology of extremes in temperature and precipitation. He teaches courses on general climatology, applied statistical analysis, and the climate change and health class from which this paper was developed as a class project.



APPENDIX

Demographic Questions

Age _____

Gender _____

Race/Ethnicity _____

Home Zip Code _____

Major _____

Background Information

Have you learned about climate change in a school setting?

- Yes No

If yes, approximately *when* did you first learn about climate change?

- Elementary school
 Middle school
 High school
 College
 Other (please specify) _____

If no, are you interested in learning about it?

- Yes No

What is your opinion?

1. Do you believe the climate is changing?

- Yes No

2. Do you believe humans are contributing to climate change?

- Yes No

3. Do you believe humans are the leading cause of climate change?

- Yes No

4. Do you believe humans should take action to mitigate the effects of a changing climate?

- Yes No

5. Do you ever doubt that the climate is changing?

- Yes No

Why?

6. Do the majority of scientists agree about whether or not climate change is occurring?

- Yes, the majority of scientists agree that climate change *is* occurring.
 Yes, the majority of scientists agree that climate change *is not* occurring.
 No, the majority of scientists **do not agree** on whether or not climate change is occurring.

7. Do the majority of scientists agree about whether or not humans are the leading cause of climate change?

- Yes, the majority of scientists agree that humans *are* the leading cause.
 Yes, the majority of scientists agree that humans *are not* the leading cause.
 No, the majority of scientists **do not agree** on whether or not humans are the leading cause of climate change.

8. How often do you talk about climate change?

- Never Seldom Sometimes Often

9. How often do you seek out information about climate change or its effects?

- Never Seldom Sometimes Often

10. What sources have informed your current thoughts on climate change? Check all that apply.

- Academic Journals
 Television
 Internet or Social Media
 Friends or Family
 Government Sources
 School Coursework
 No sources of climate change information
 Other (please specify) _____

11. Has climate change been discussed in GY 101?

- Yes No

12. Has your time in GY 101 influenced your thoughts on climate change?

- Yes No

How?

13. How serious of an issue do you believe climate change is?

- Extremely Serious
 Very Serious
 Moderately Serious
 Slightly Serious
 Not Serious at all

14. Do you believe climate change is a concern for any of the following? Check all that apply:

- Infrastructure (Roads, bridges, buildings, etc.)
 Human Health
 Economy
 National Security
 Natural Resources
 Ecosystem
 None of these

15. What questions do you have about climate change?