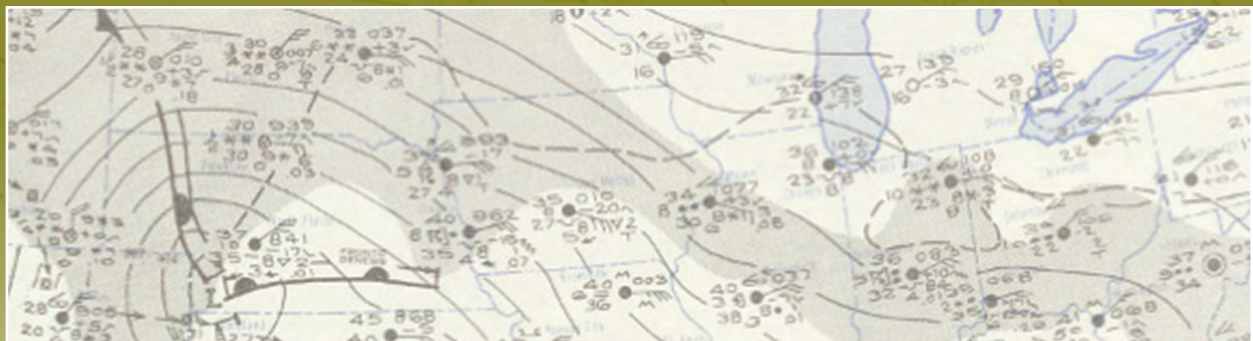


A 2016 SURVEY OF AMERICAN METEOROLOGICAL SOCIETY MEMBERS ABOUT CLIMATE CHANGE

Initial Findings



GEORGE MASON UNIVERSITY
CENTER for CLIMATE CHANGE
COMMUNICATION

A 2016 National Survey of American Meteorological Society

Member Views on Climate Change:

Initial Findings

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Introduction

This report provides initial findings from the national survey of American Meteorological Society (AMS) member views on climate change conducted by George Mason University and AMS, with National Science Foundation funding.

Our survey was administered via email between January 6 and January 31, 2016. After making an initial request to participate, we sent up to five additional requests/reminders to participate to those people who had not yet completed a survey. A total of 4,092 AMS members participated, with participants coming from the United States and internationally. The participation rate in the survey was 53.3%.

We wish to sincerely thank all AMS members who took time out of their busy schedules to participate in this research. We hope the following report is useful to them.

Funding for this research was provided by NSF Award # DRL-1422431.

Summary of Findings

Views on climate change:

- Nearly all AMS members (96%) think climate change – as defined by AMS – is happening, with almost 9 out of 10 (89%) stating that they are either ‘extremely’ or ‘very’ sure it is happening. Only 1% think climate change is not happening, and 3% say they don’t know.
- A large majority of AMS members indicated that human activity is causing at least a portion of the changes in the climate over the past 50 years. Specifically: 29% think the change is largely or entirely due to human activity (i.e., 81 to 100%); 38% think most of the change is caused by human activity (i.e., 61 to 80%); 14% think the change is caused more or less equally by human activity and natural events; and 7% think the change is caused mostly by natural events. Conversely, 5% think the change is caused largely or entirely by natural events, 6% say they don’t know, and 1% think climate change isn’t happening.
- AMS members have diverse views on the extent to which additional climate change can be averted over the next 50 years, if mitigation measures are taken worldwide. Only 18% think a large amount or almost all additional climate change can be averted, while many more think a moderate (42%) or a small (25%) amount of additional climate change can be averted. Only 9% think almost no additional climate change can be averted, and 6% say they don’t know.
- AMS members also hold diverse views about the extent to which harm – to people’s health, agriculture, fresh water supplies, transportation systems, and homes and other buildings – can be prevented over the next 50 years. About one quarter to one third (22% to 37%) think a large amount or almost all of the harm to these things can be prevented, while approximately another one third (30% to 43%) think a moderate amount of harm can be prevented, and about one quarter (17% to 28%) think only a small amount or none of the harm can be prevented. About one in ten (7 to 10%) don’t know, and about one in twenty (3 to 5%) don’t think there will be any harm from climate change in the next 50 years.
- Nearly one in five AMS members (17%) say their opinion about climate change has changed in the past five years. Of those, the large majority (87%) say they now feel more convinced that climate change is happening, most commonly because of one or more of the following reasons: new peer-reviewed climate science (66%); the scientific community becoming more certain (48%); having personally seen evidence of climate change (46%); or one or more climate scientists who influenced them (30%).

Views on local impacts of climate change:

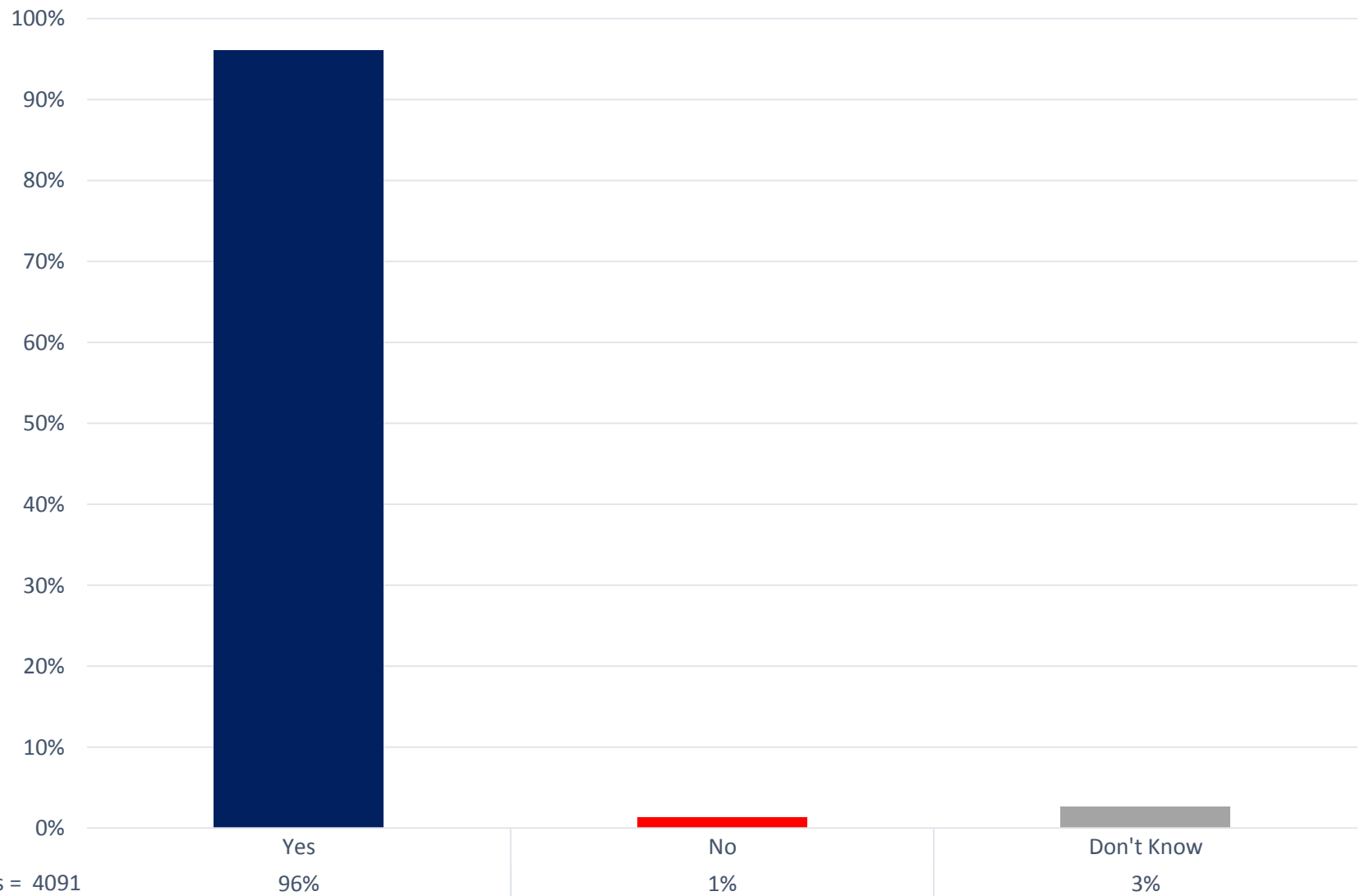
- Nearly three out of every four AMS members (74%) think the local climate in their area has changed in the past 50 years as a result of climate change, while one in ten (11%) think it hasn't, and a nearly one in six say they don't know (15%).
- Seven out of ten AMS members who think their local climate has changed say the impacts have been primarily harmful (36%) or approximately equally mixed between harmful and beneficial (36%). One out of five (21%) AMS members say they don't know.
- Almost eight in ten AMS members (78%) think the local climate in their area will change over the next 50 years. About half (47%) of these respondents say the impacts will be primarily harmful, while 29% say the impacts will be equally mixed between beneficial and harmful. One in five are not sure how climate change will impact their local area.

A diverse group of AMS members participated in the survey:

- Approximately eight in ten respondents are men (81%) and one in five are women (18%). Respondents range in age from 18 to 29 (6%) to 70+ (11%), with a modal age category of 50 to 59 (25%).
- Most respondents hold a BS (32%), MS (30%) or Ph.D (33%) in meteorology/atmospheric science. Other commonly reported degrees are BS (17%), MS (10%), or Ph.D (12%) degrees in another STEM field.
- More than one in three (37%) AMS members who participated in this survey consider themselves 'expert' in climate science.

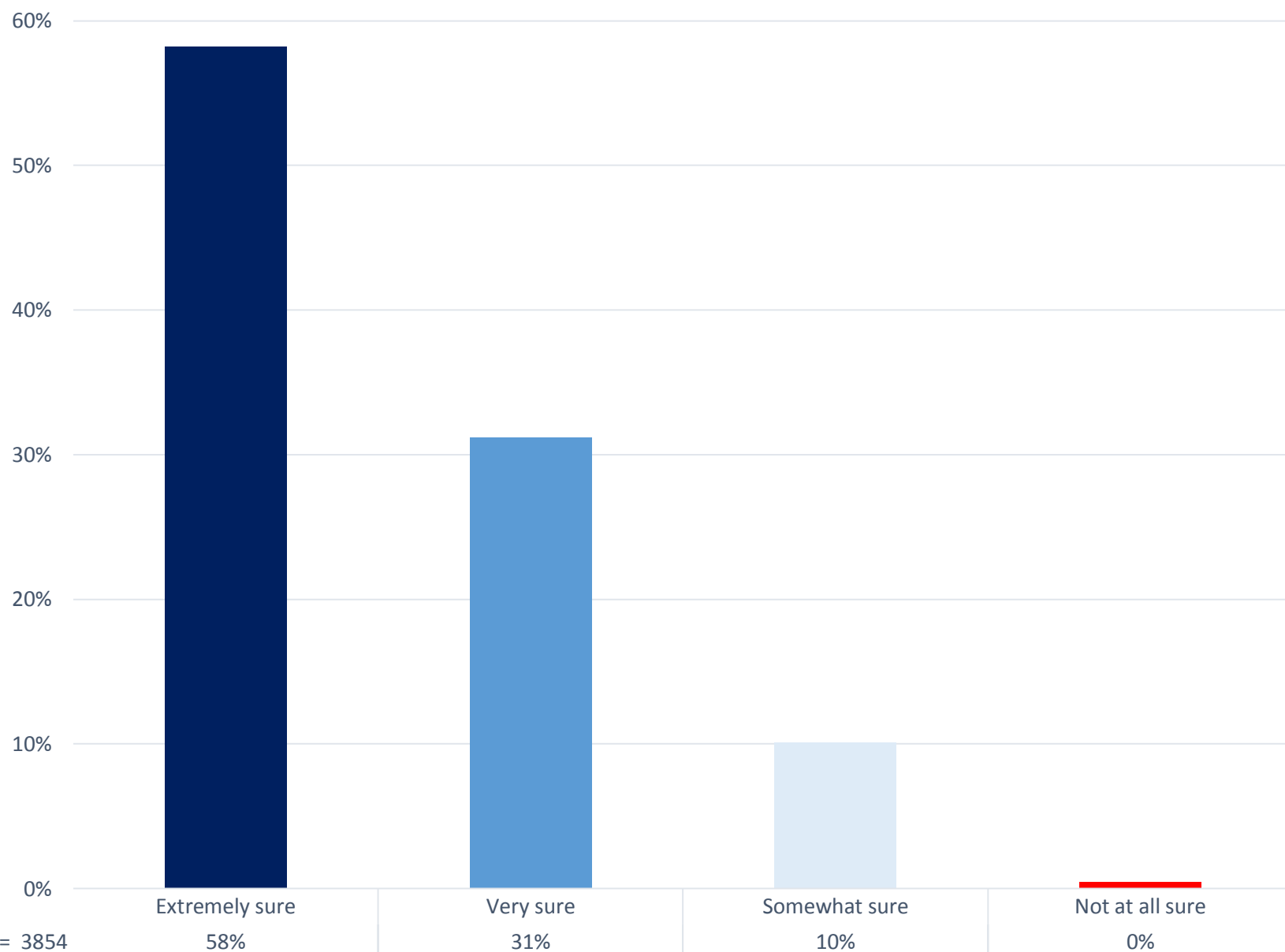
DETAILED FINDINGS: VIEWS ON CLIMATE CHANGE

*Regardless of the cause, do you think climate change is happening?**



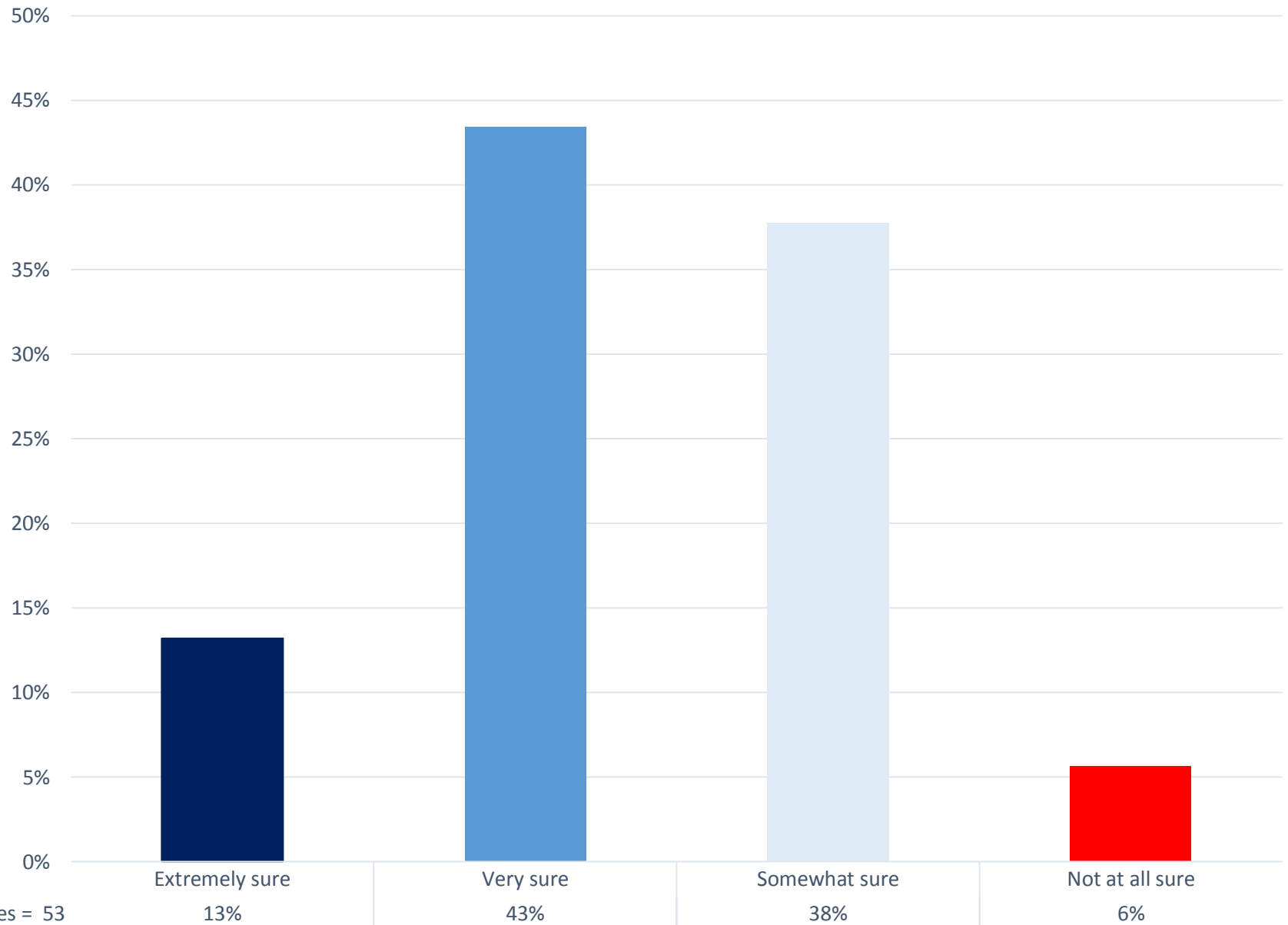
*Question was preceded by this statement: "Please read the following information: The American Meteorological Society (AMS) defines climate change as: "Any systematic change in the long-term statistics of climate elements (such as temperature, pressure, or winds) sustained over several decades or longer. Climate change may be due to: natural external forcings, such as changes in solar emission or slow changes in the earth's orbital elements; natural internal processes of the climate system; or anthropogenic forcing."

*How sure are you that climate change is happening?**



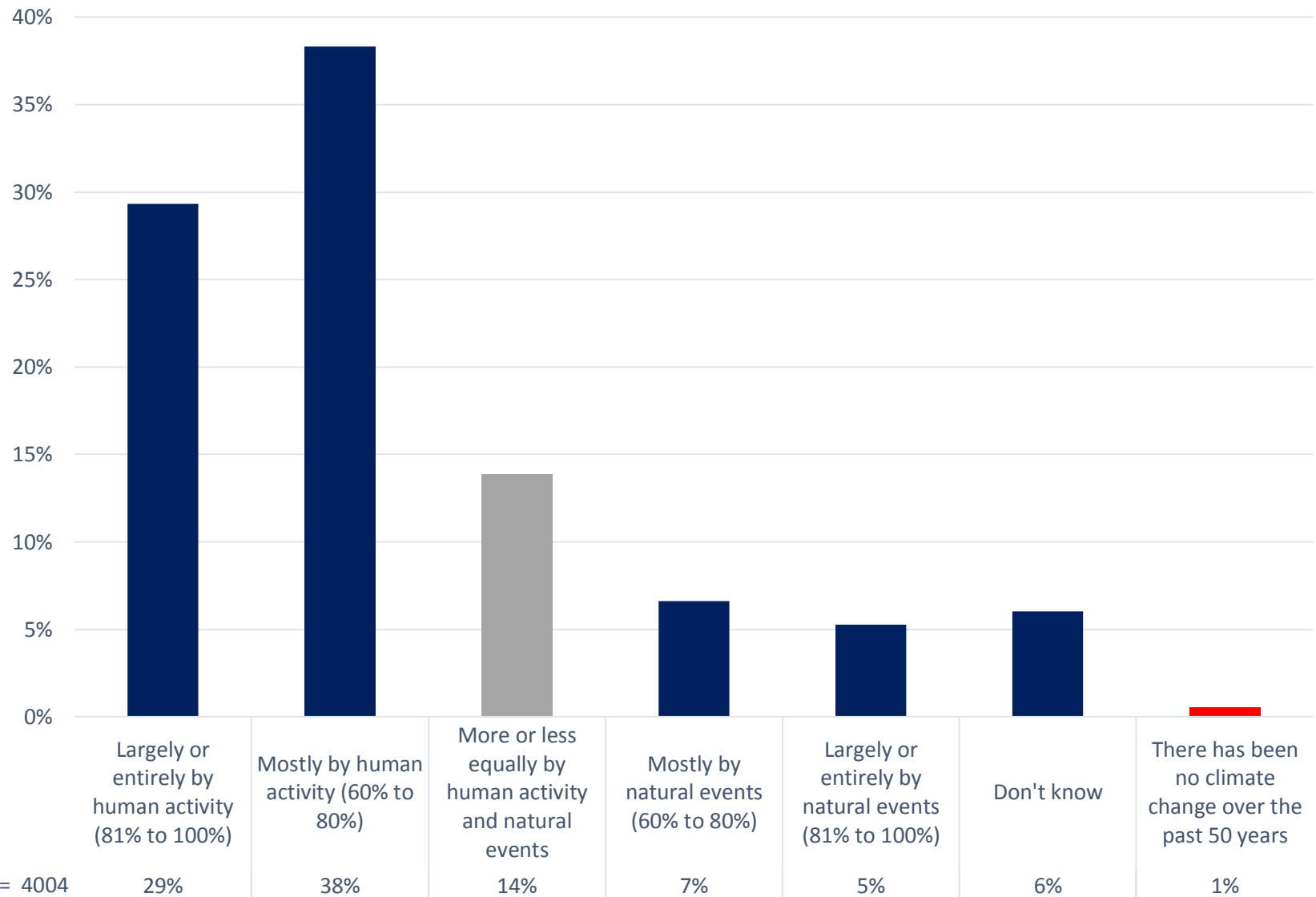
*Question asked only of those who responded that they believe climate change is happening.

*How sure are you that climate change is not happening?**

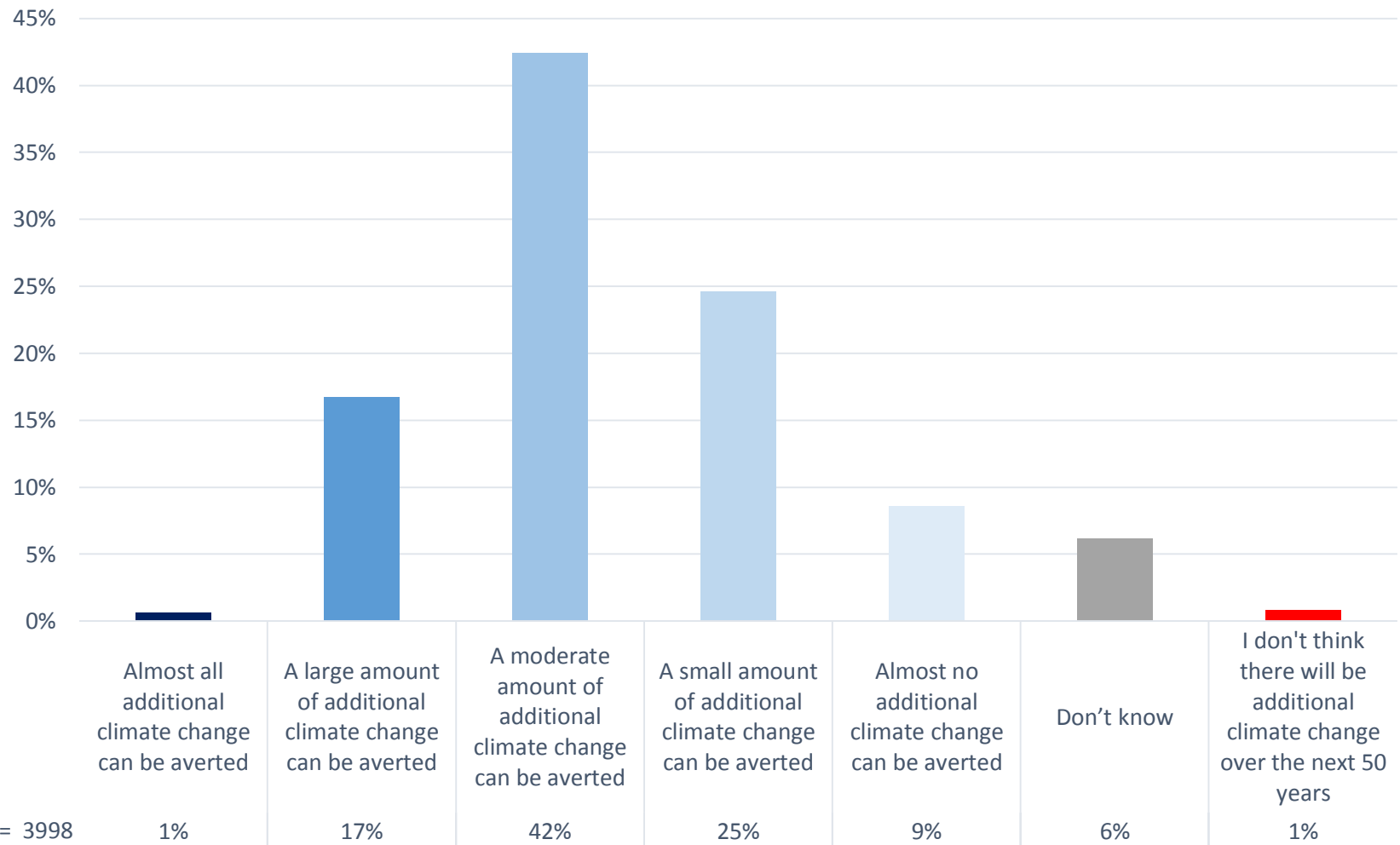


*Question asked only of those who responded that they believe climate change is not happening.

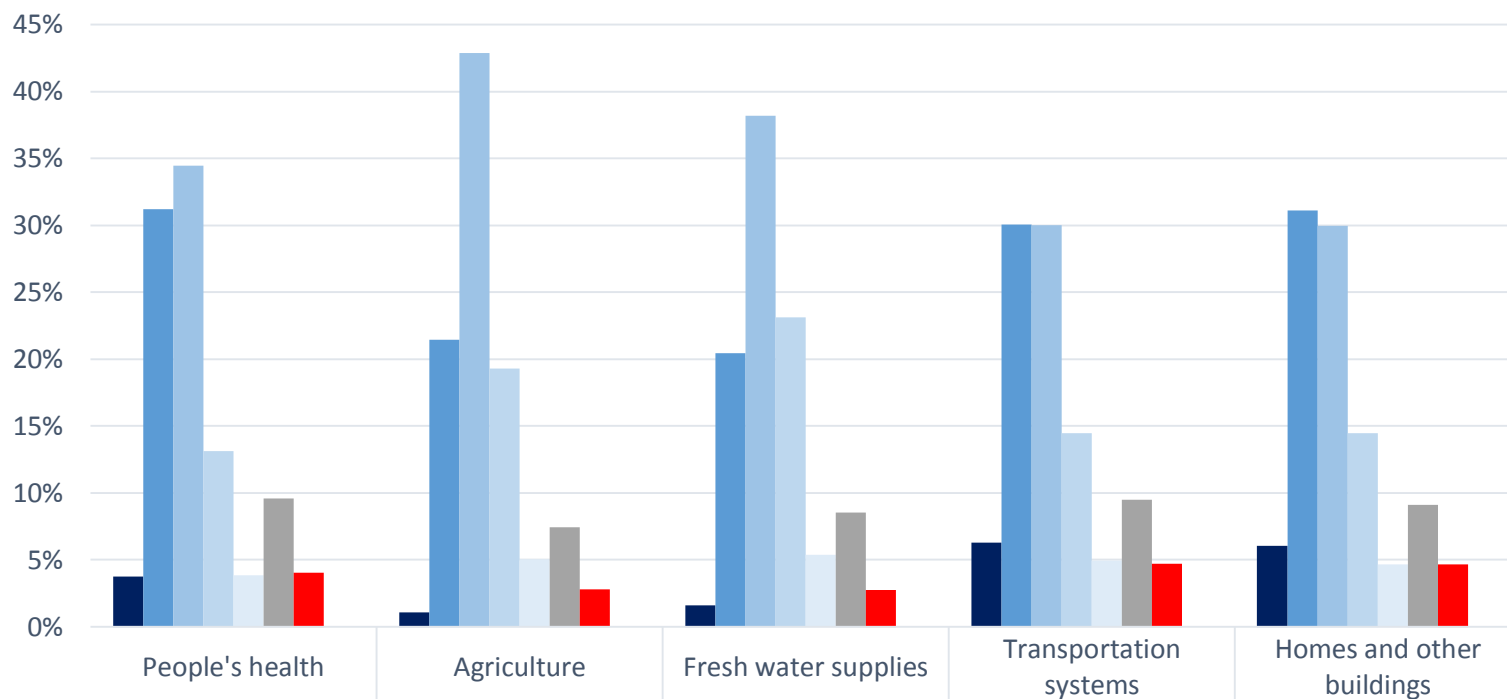
Do you think that the climate change that has occurred over the past 50 years has been caused...



Over the next 50 years, to what extent can additional climate change be avoided if mitigation measures are taken worldwide (such as substantially reducing emissions of carbon dioxide and other greenhouse gases)?

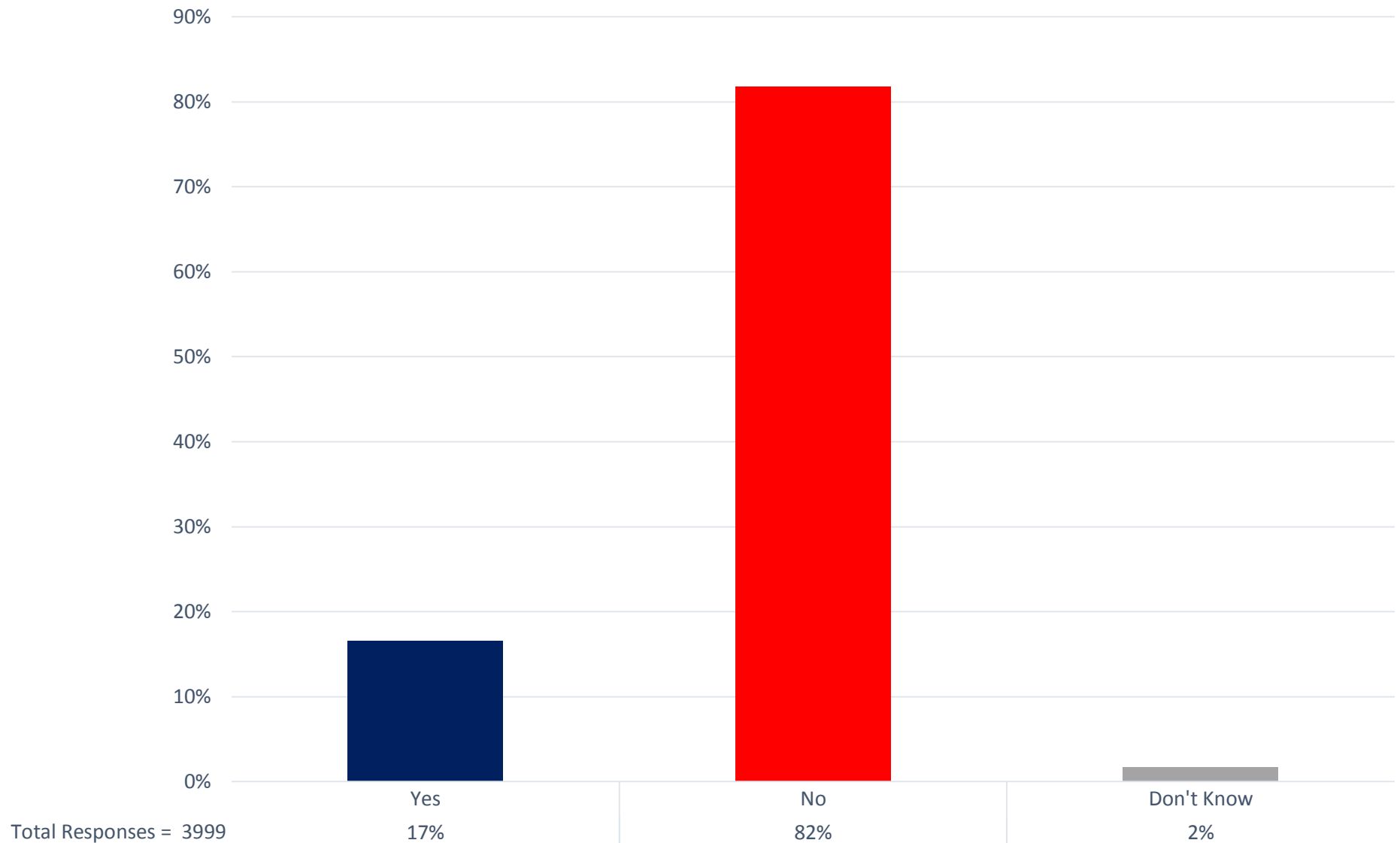


Over the next 50 years, in the United States, to what extent can the following be protected from harmful impacts of climate change if adaptation measures (i.e., actions to reduce vulnerability) are taken?

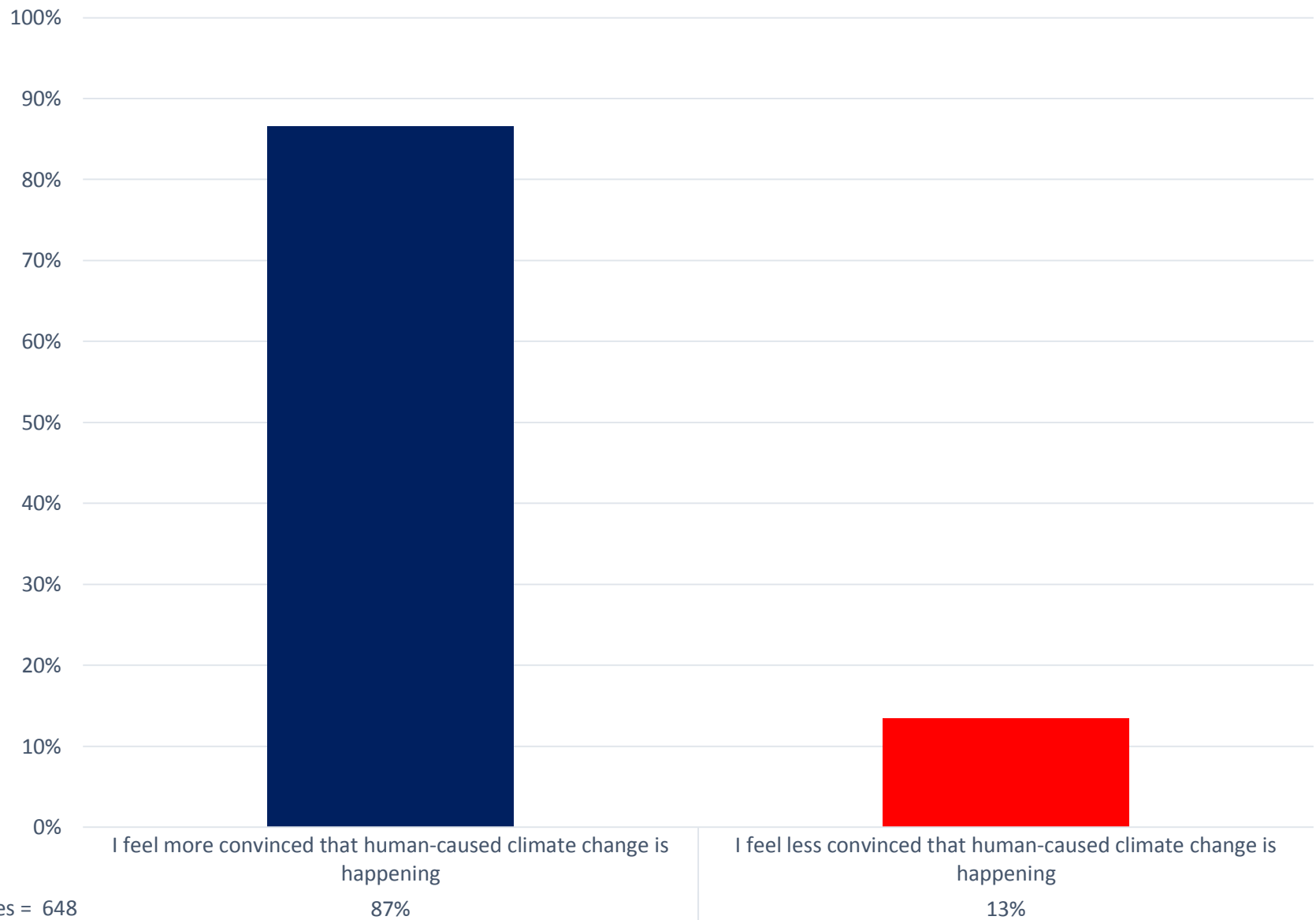


■ Almost all	4%	1%	2%	6%	6%
■ Large amount	31%	21%	20%	30%	31%
■ Moderate amount	34%	43%	38%	30%	30%
■ Small amount	13%	19%	23%	14%	14%
■ Almost none	4%	5%	5%	5%	5%
■ Don't know	10%	7%	9%	9%	9%
■ No harm due to climate change	4%	3%	3%	5%	5%
Total Responses	3949	3943	3938	3941	3939

Has your opinion/position on climate change changed in the past five years?

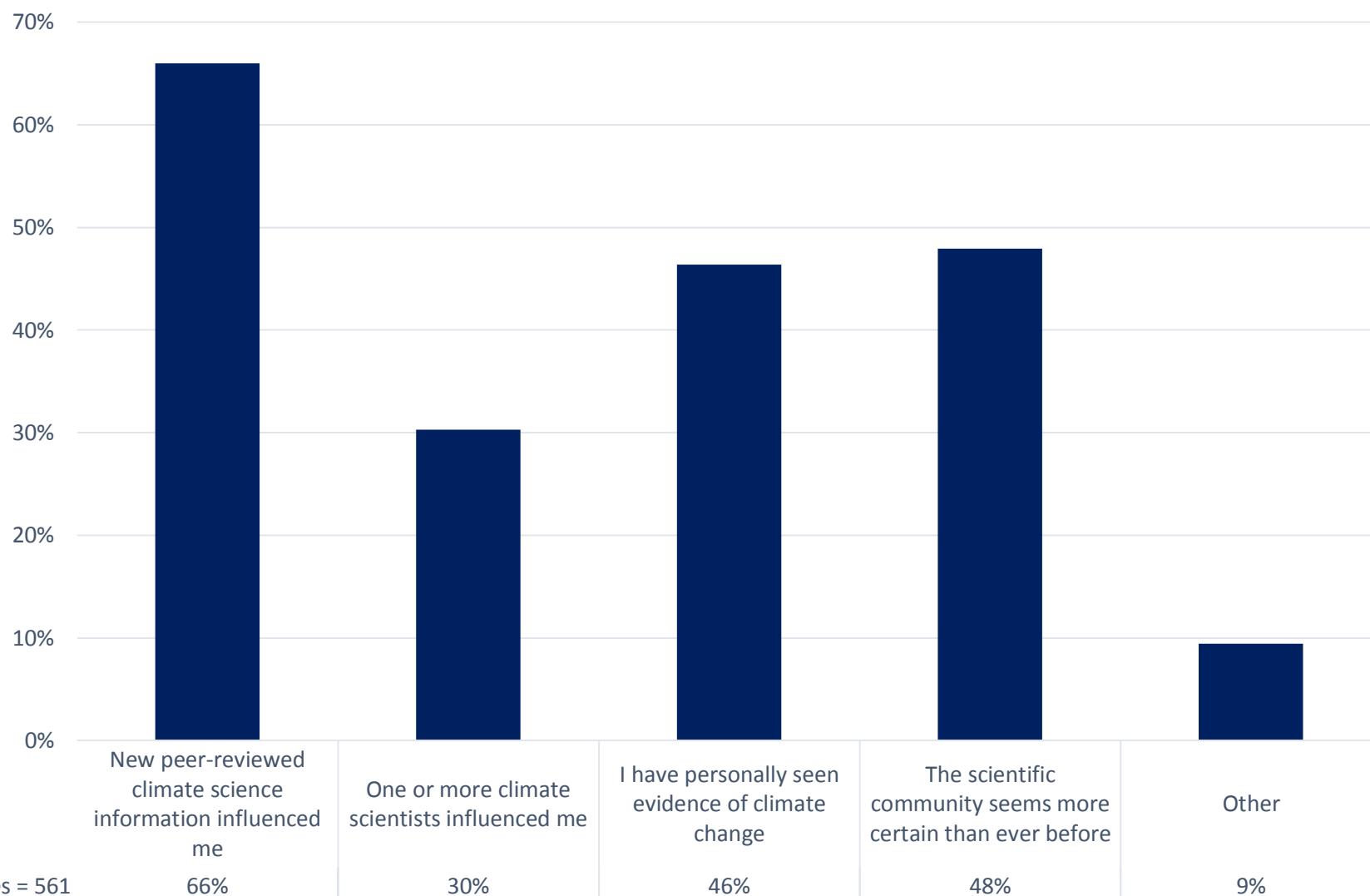


*How has your opinion/position changed?**



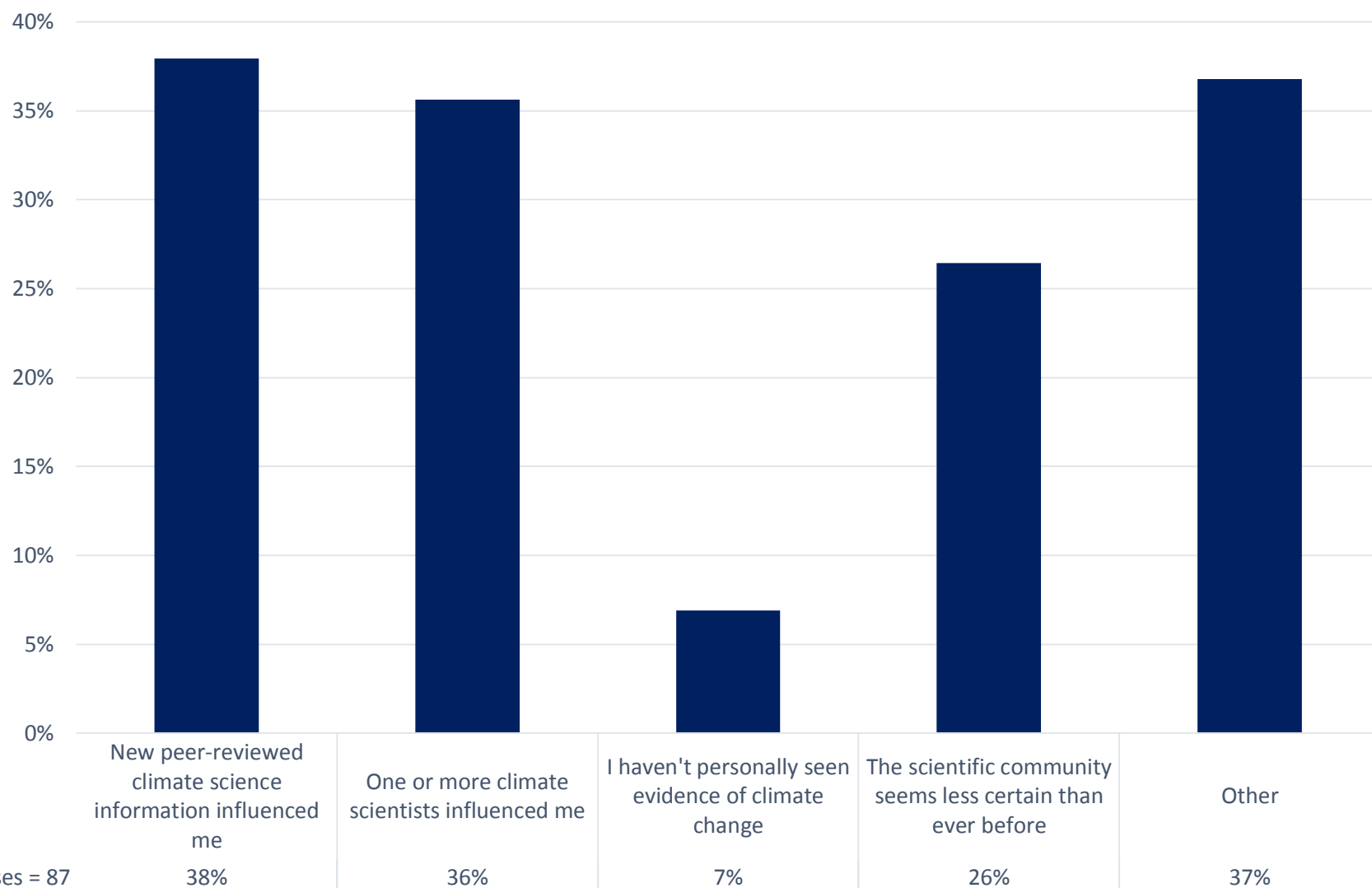
*Question asked only of those who responded that their opinion on climate change has changed.

*Which if any of the following reasons contributed to your being more convinced that human-caused climate change is happening? (check all that apply)**



*Question asked only of those who responded that they are more convinced human-caused climate change is happening.

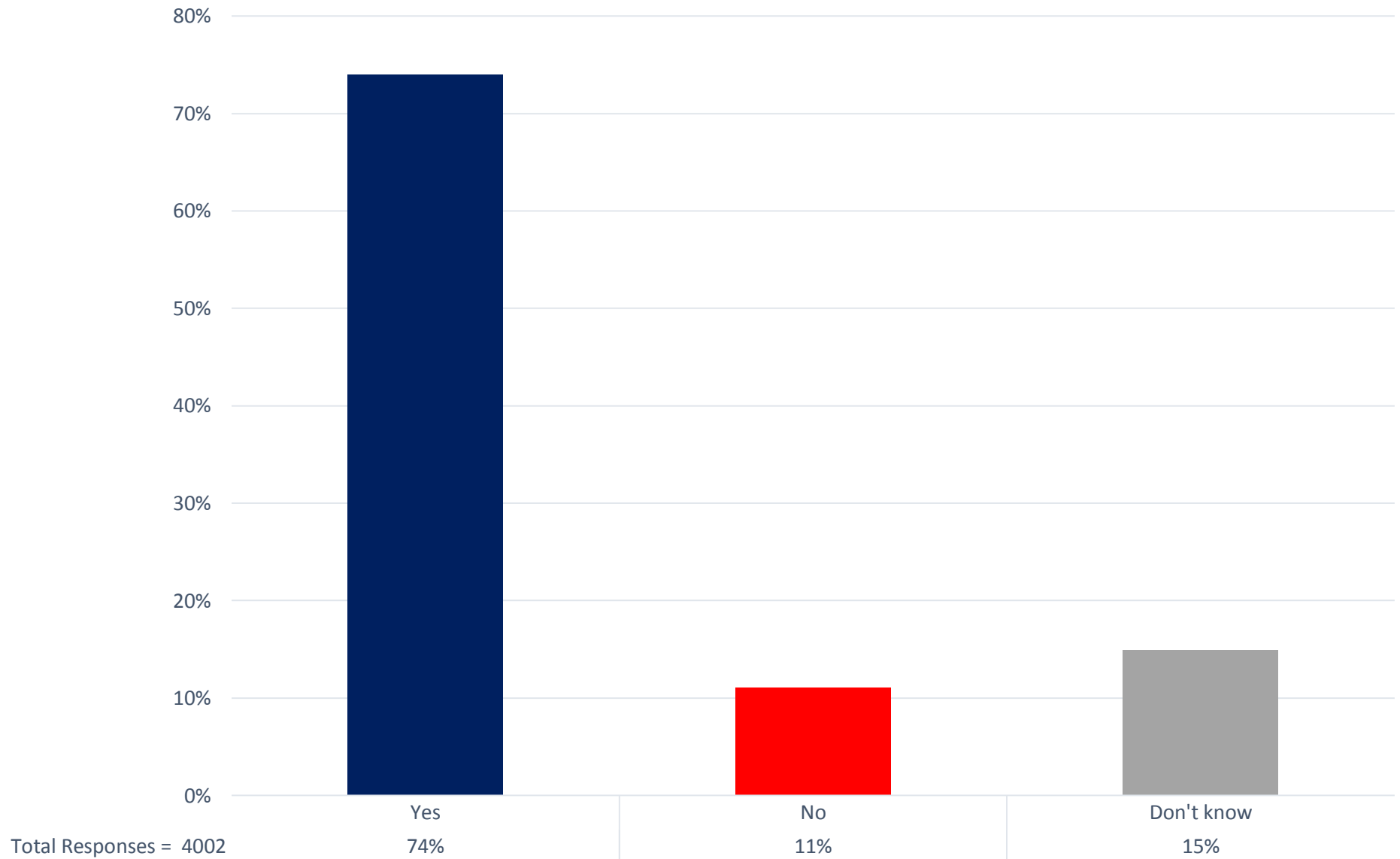
*Which if any of the following reasons contributed to your being less convinced that human-caused climate change is happening? (check all that apply)**



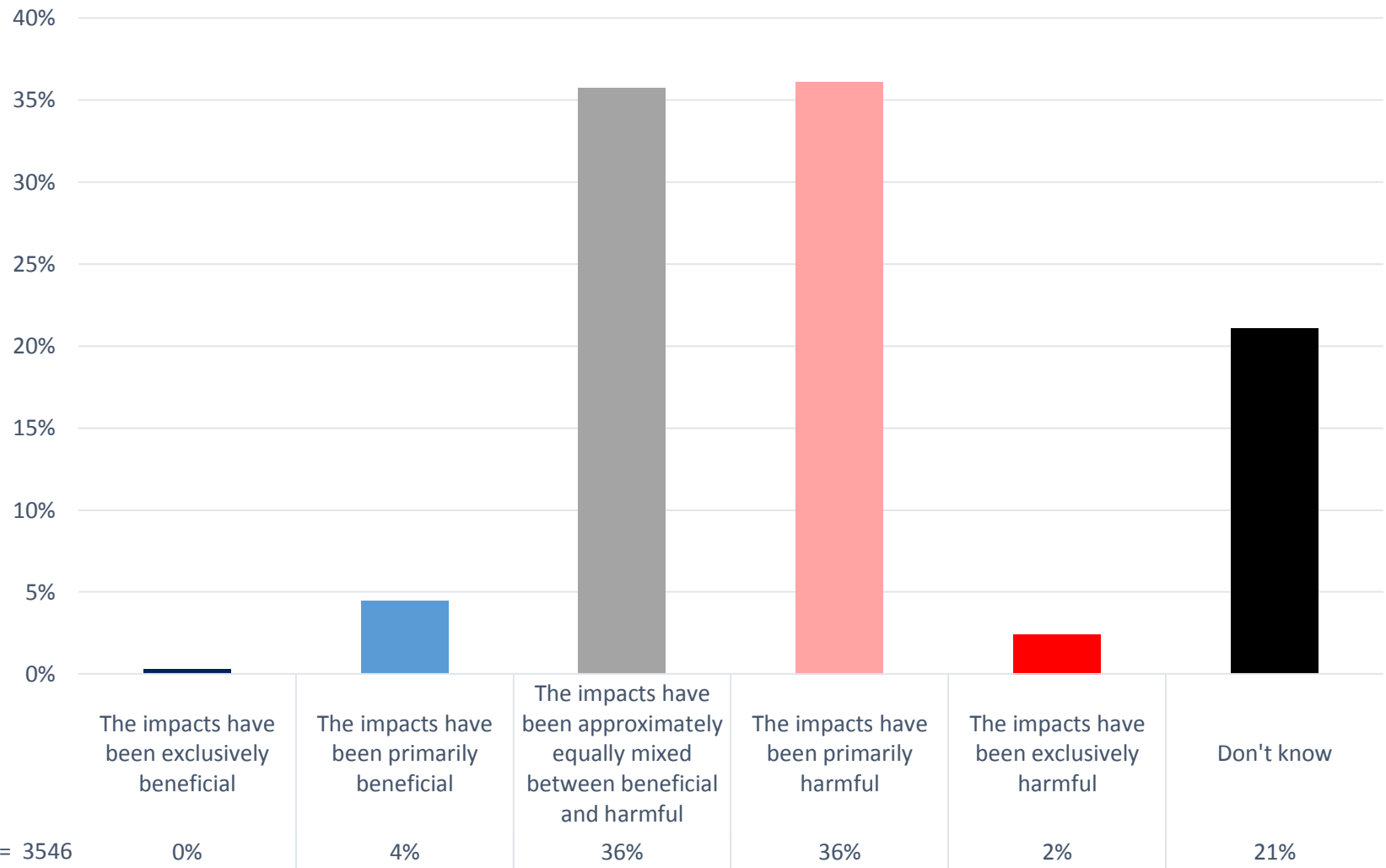
*Question asked only of those who responded that they are less convinced human-caused climate change is happening.

VIEWS ON LOCAL IMPACTS OF CLIMATE CHANGE

To the best of your knowledge, has the climate in your area changed over the past 50 years?



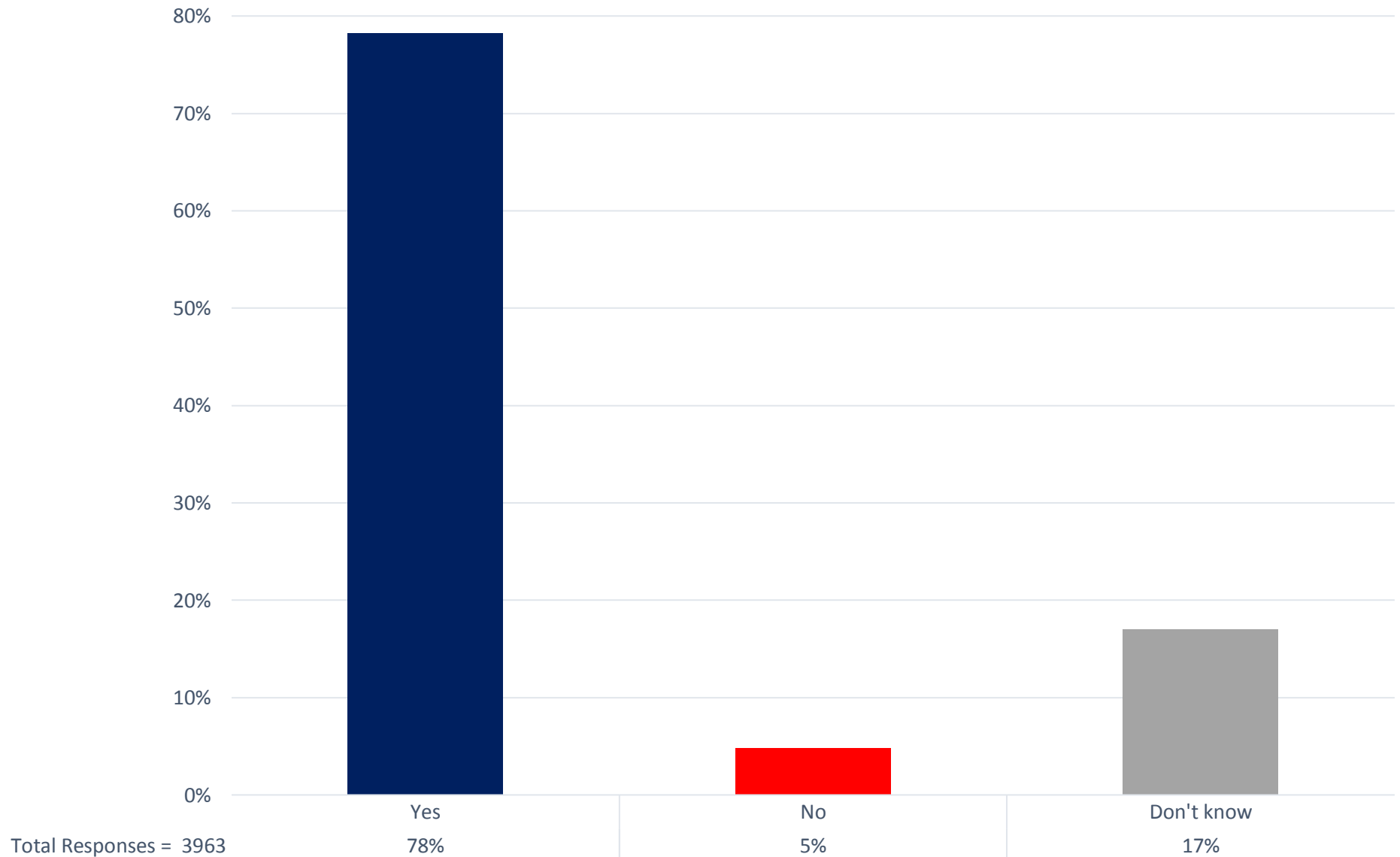
*Which of the following best describes the impact(s) of the local climate change in your area over the past 50 years?**[°]



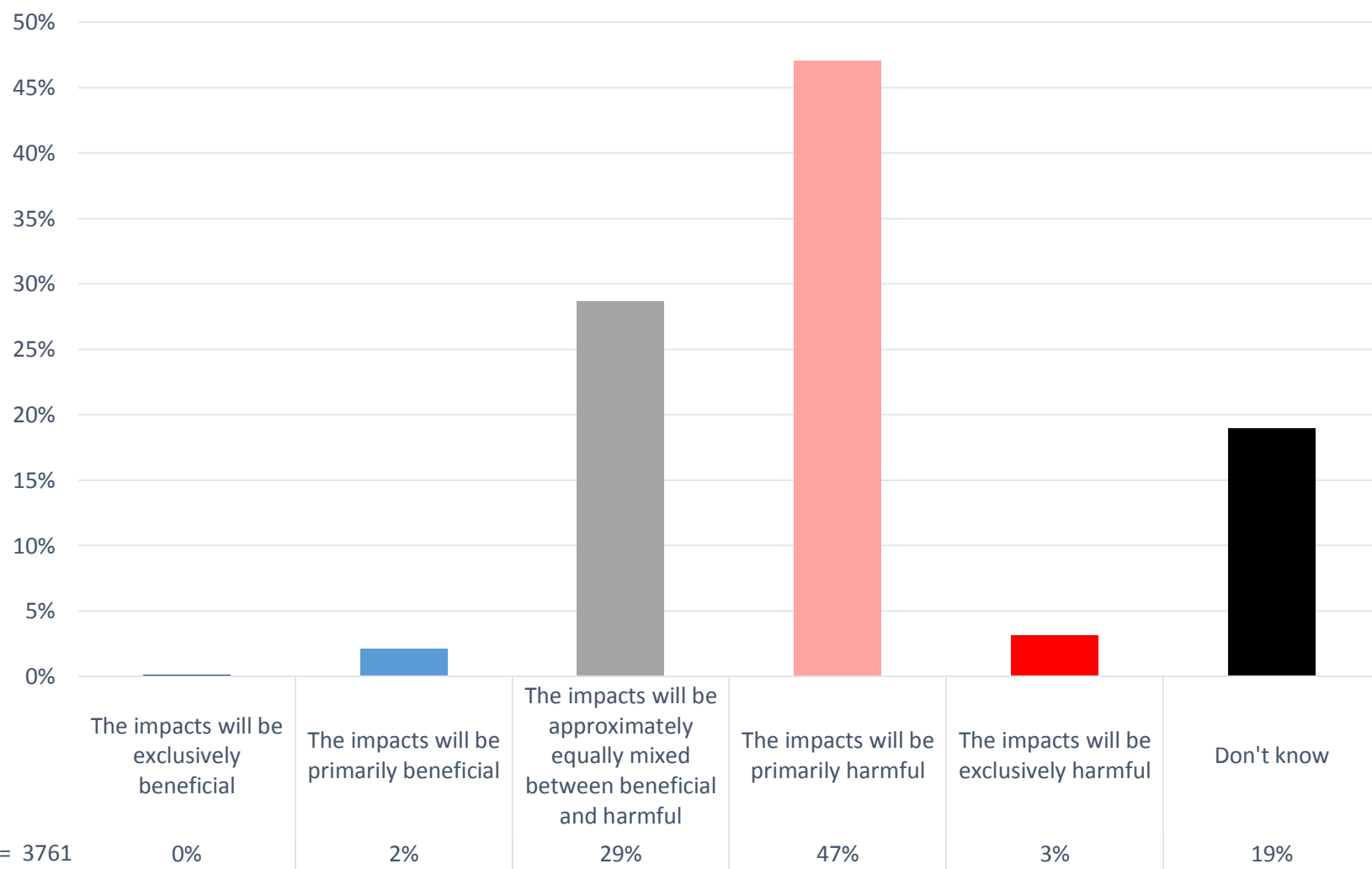
*Question asked only of those who responded that the local climate has changed.

[°] Two open-ended follow-up questions were asked: "Briefly, in your own words, what has been the most harmful impact of climate change in your area over the past 50 years?" (n=2439), and "Briefly, in your own words, what has been the most beneficial impact of climate change in your area over the past 50 years?" (n=2176). Responses to these questions have not yet been coded.

To the best of your knowledge, will the local climate in your area change over the next 50 years?



*Which of the following best describes the impact(s) of the local climate change in your area over the next 50 years?**^o

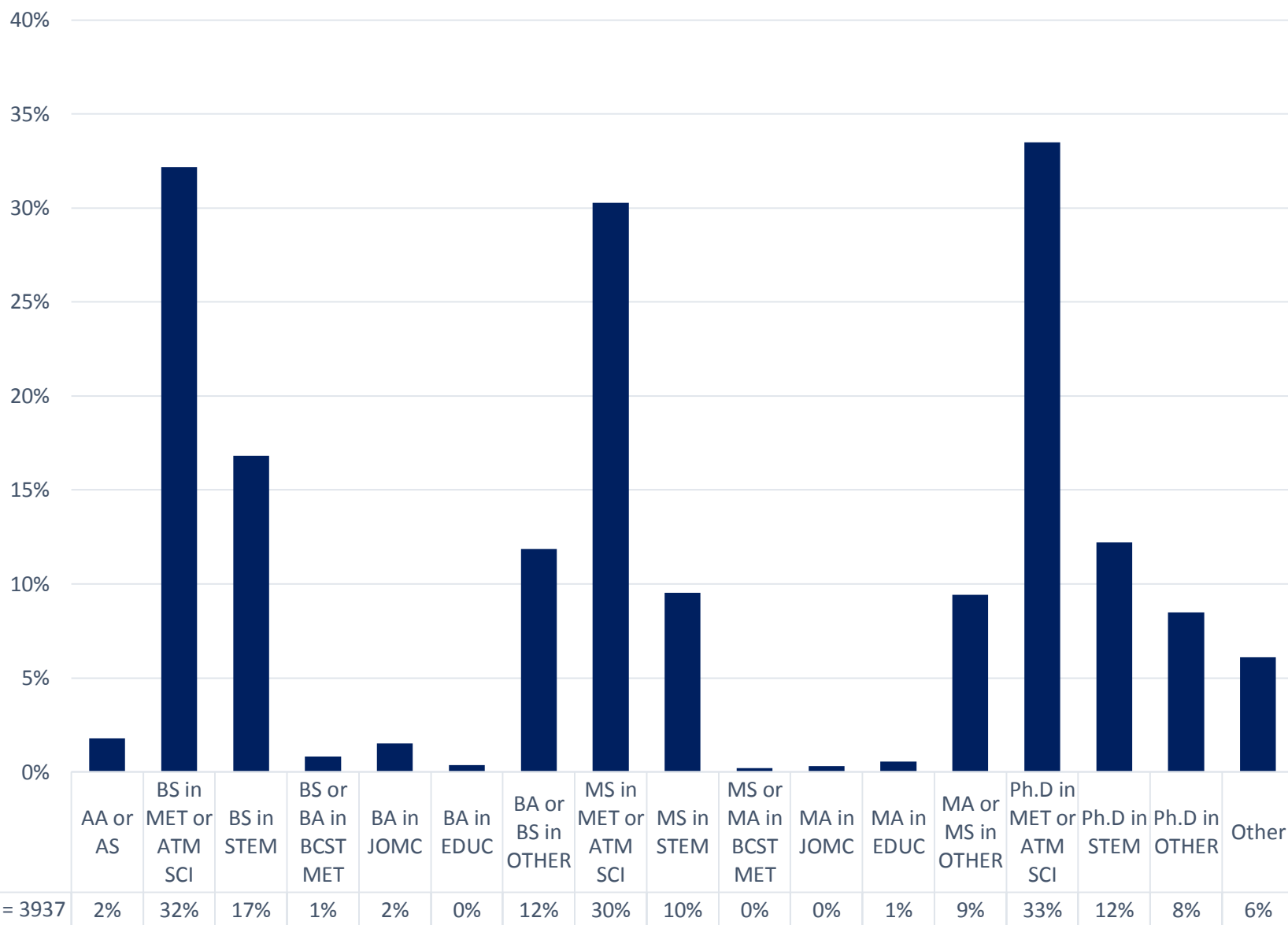


*Question asked only of those who responded that the local climate will change in the next 50 years.

^oTwo open-ended follow-up questions were asked: "Briefly, in your own words, what is likely to be the most harmful impact of climate change in your area over the next 50 years?" (n=2636), and "Briefly, in your own words, what is likely to be the most beneficial impact of climate change in your area over the next 50 years?" (n=2289). Responses to these questions have not yet been coded.

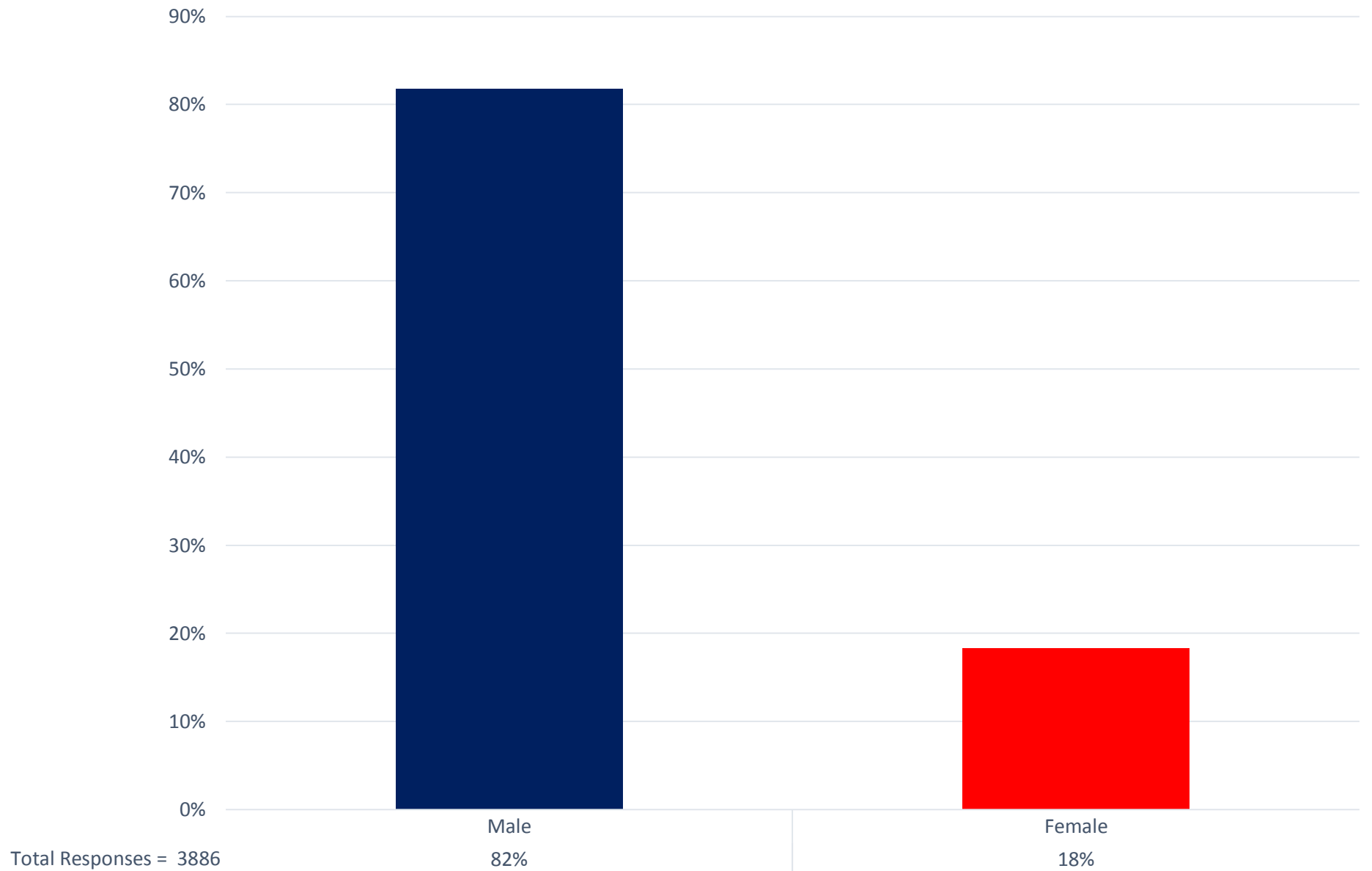
BACKGROUND INFORMATION ABOUT THE RESPONDENTS

Which educational degrees do you hold (check all that apply)*

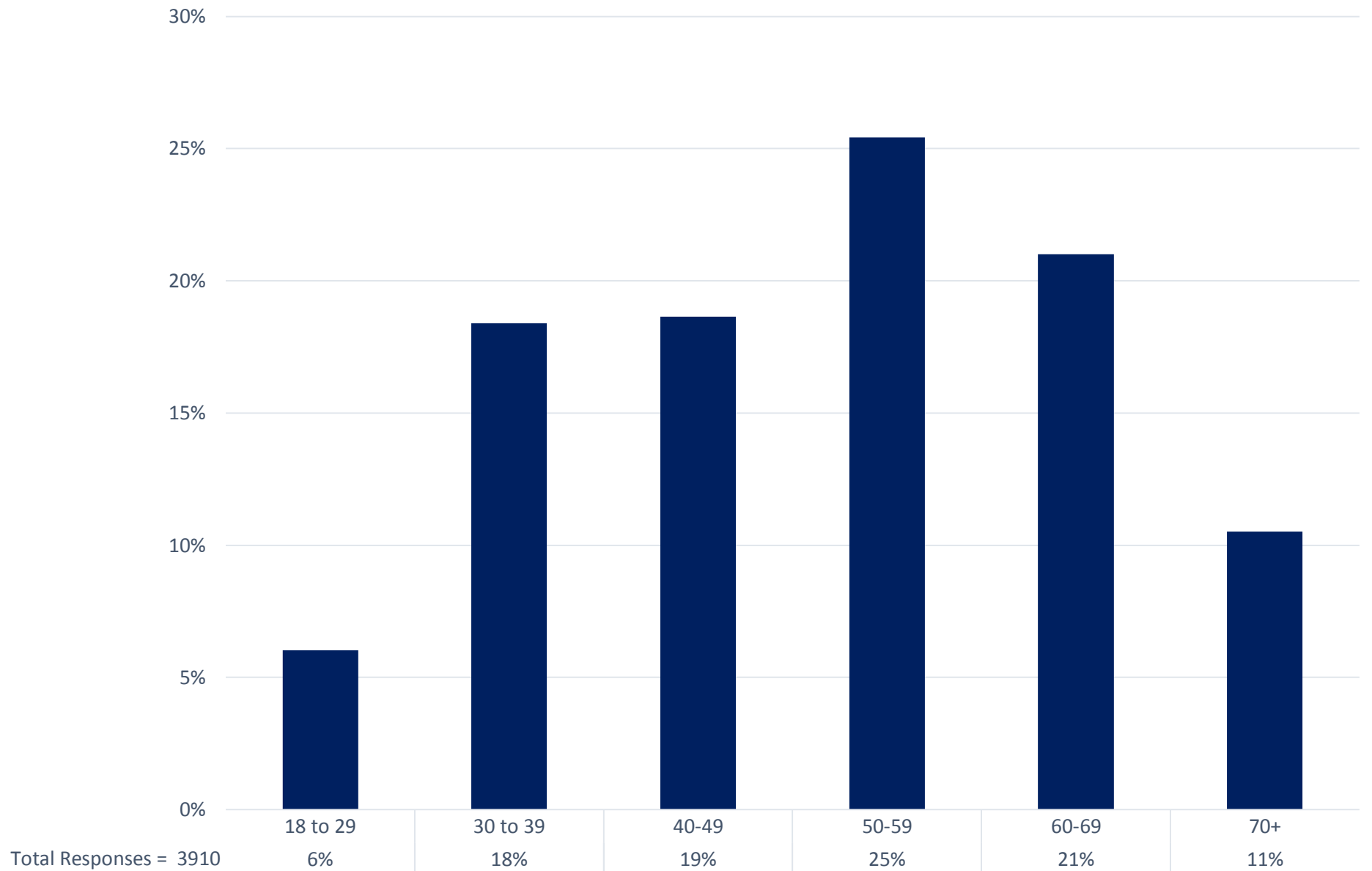


*BCST MET= Broadcast Meteorology; MET= Meteorology; ATM SCI= Atmospheric Science; STEM= Science, Technology, Engineering, Mathematics; JOMC= Journalism & Mass Communication; EDUC= Education

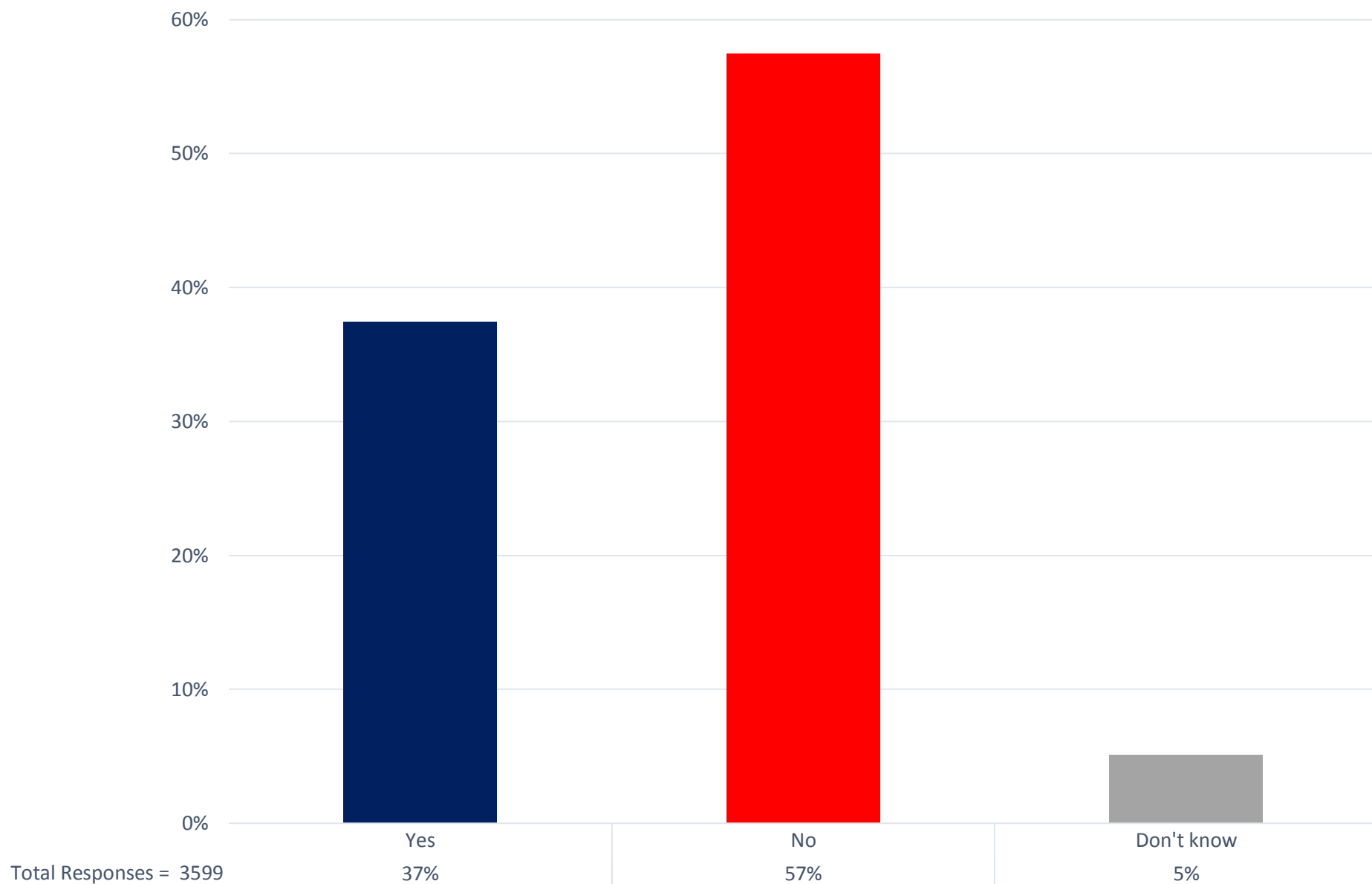
What is your gender?



What is your age?



Do you consider yourself an expert in climate science?



Survey Methodology

Data from two surveys – conducted concurrently, using identical methods – were merged to produce the current report. Survey #1 was directed at all professionals currently working in broadcast meteorology in the United States, including but not limited to AMS members. Full details about the sampling frame for that study are reported elsewhere (see: Maibach, E., Perkins, D., Francis, Z., Myers, T., Seitter, K., et al. (2016) A 2016 National Survey of Broadcast Meteorologists: Initial Findings. George Mason University, Fairfax, VA: Center for Climate Change Communication.). Survey #2 was directed to all professional (i.e., non-student) members of the American Meteorological Society for whom AMS had an email address on file, except broadcast meteorologists. The former survey was longer, covering a broader set of topics, but both surveys included an identical set of questions about climate change, that are reported here.

Sampling frames. Study #1: In late 2015, we used data from a commercial database – which we then manually verified – to create a list of all 2,033 professionals currently working in the field of broadcast meteorology in the United States. Concurrently, AMS provided a list of their 1,038 broadcast members. Thus, the sampling frame of AMS broadcast members for the current study was 1,038. Study #2: The AMS provided a list of 6,738 professional (i.e., non-student) members who were not broadcast meteorologists and for whom AMS had an email address on file.

Survey procedure. The surveys were administered online using Qualtrics survey software. On January 6, 2016, an invitation to participate was emailed to 2,033 broadcast meteorologists (Study #1), and a separate invitation was emailed to 6,738 AMS members (Study #2). (Note: In Study #2, we received 94 bounced emails for which no alternative email address could be located, resulting in a revised sampling frame of 6,644 professionals.) The surveys were fielded between January 6 and January 31; non-respondents were sent up to five email reminders, approximately once per week.

Response rates. Of the 7,682 people in our sampling frame (1,038 broadcast members, and 6,644 other professional members), 4,092 completed a portion of the survey – yielding a participation rate of 53.3%, and 3,952 completed the survey in its entirety – yielding a survey completion rate of 51.4%. It is important to note that 3,364 people (43.8% of our total sample) did not open any email associated with this survey. We are therefore unable to determine if these people choose not to participate, or if our emails were captured by a spam filter, denying them the opportunity to participate. Of those who participated (4,092), 96.6% completed the entire survey. The median time to complete the survey was 5 minutes.

Comparison of participants to population. To assess the extent to which those who participated in our survey sample differed systematically from the population, we compared respondents to the entire AMS membership based on the only known variable: gender. Women made up identical proportions of survey respondents and the AMS member list, 18%, suggesting no participation bias on at least this one known variable.