The background image shows a field of corn plants that have been severely affected by drought. The plants are mostly dead, with dry, brown leaves and stalks. The ground is dry and cracked. The overall tone is somber and highlights the impact of extreme weather on agriculture.

Do extreme events cause a shift in climate change beliefs? A study of the 2012 Midwestern U.S. drought and agriculture

Stuart Carlton
Texas Sea Grant
Texas A&M University

Amber Mase
Forestry & Wildlife Ecology
University of Wisconsin

Cody Knutson
National Drought Mitigation Center
University of Nebraska

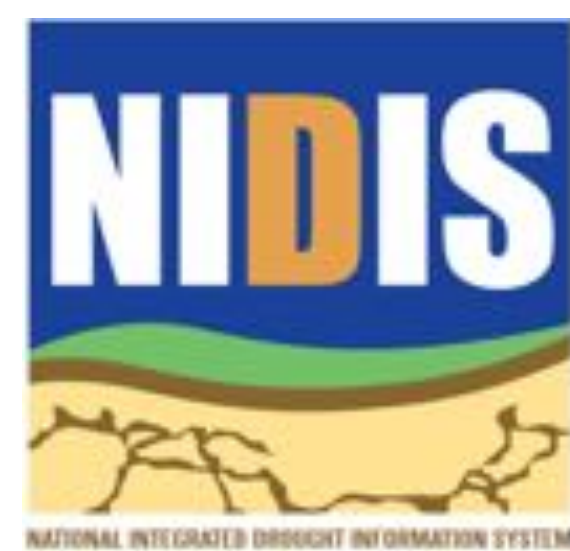
Maria Lemos
Natural Resources & Environment
University of Michigan

Tonya Haigh
National Drought Mitigation Center
University of Nebraska

Dennis Todey
Ag & Biosystems Engineering
South Dakota State University

Linda Prokopy
Natural Resources Social Science Lab
Purdue University

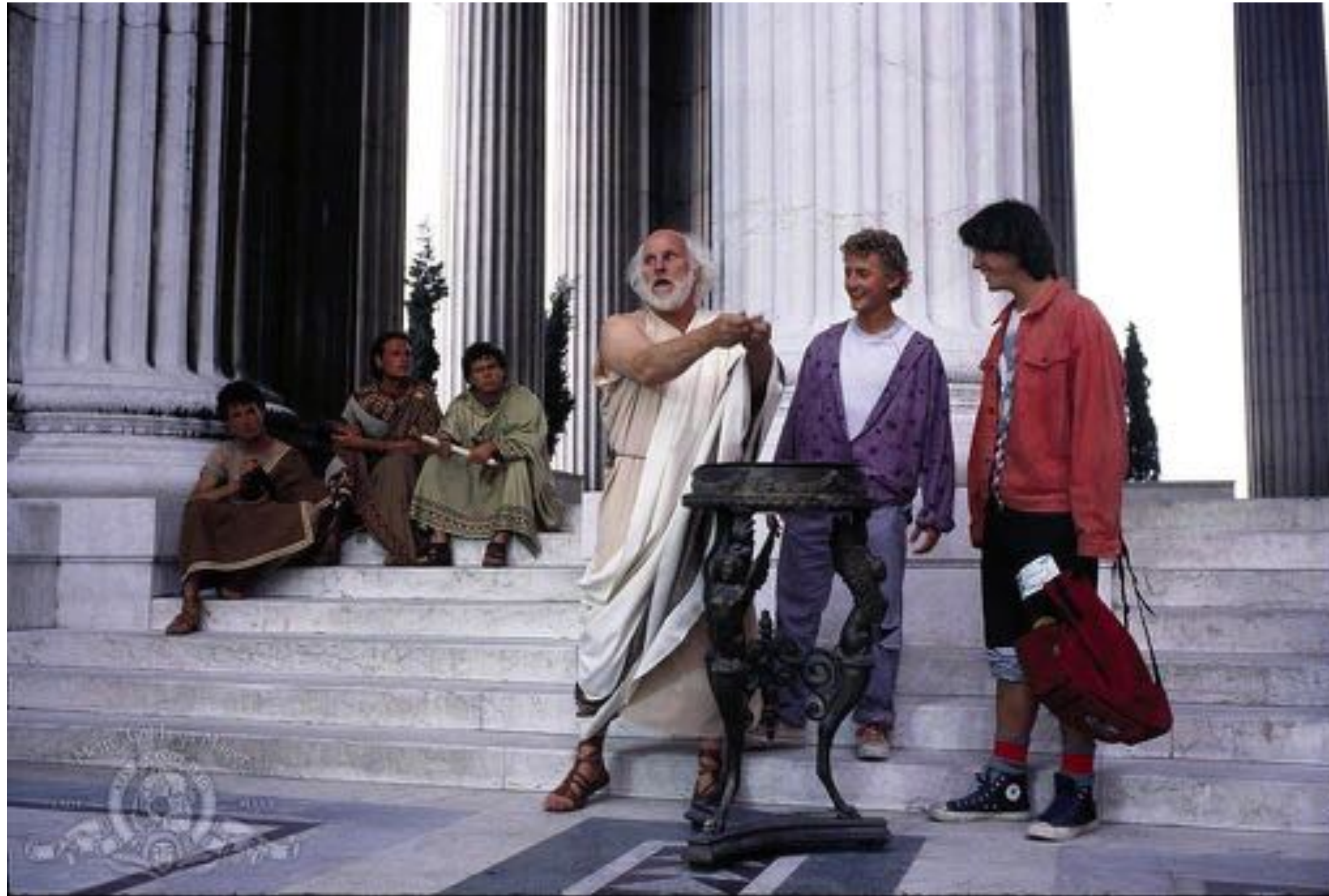




Meta-webinar stuff



This ain't ancient Greece.



Feel free to speak up, but there will be question breaks.



Any unanswered questions:

StuartCarlton@tamu.edu

<http://www.AgClimate4U.org>

This is a diverse group...let's get
on the same page.



3

things social science teaches
us about **climate change and
the American public**



Illustration: Stephen Wilkes

1. People still lag behind scientists in climate change belief.

YALE PROJECT ON

Climate Change Communication

Bridging Science & Society

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What Can I Do?

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Climate Change in the American Mind April 2014



Download the PDF

The reality of climate change – worldwide and in the United States – is a well-established scientific fact. The first finding in the recently released 2014 National Climate Assessment (written and reviewed by hundreds of climate experts over the past 4 years), for example, concluded: “Global climate is changing and this is apparent across the United States in a wide range of observations.”

Global Temperature Change: Decade Averages



Climate Notes

Peer Reviewed Articles

Research Reports

Videos and Webinars



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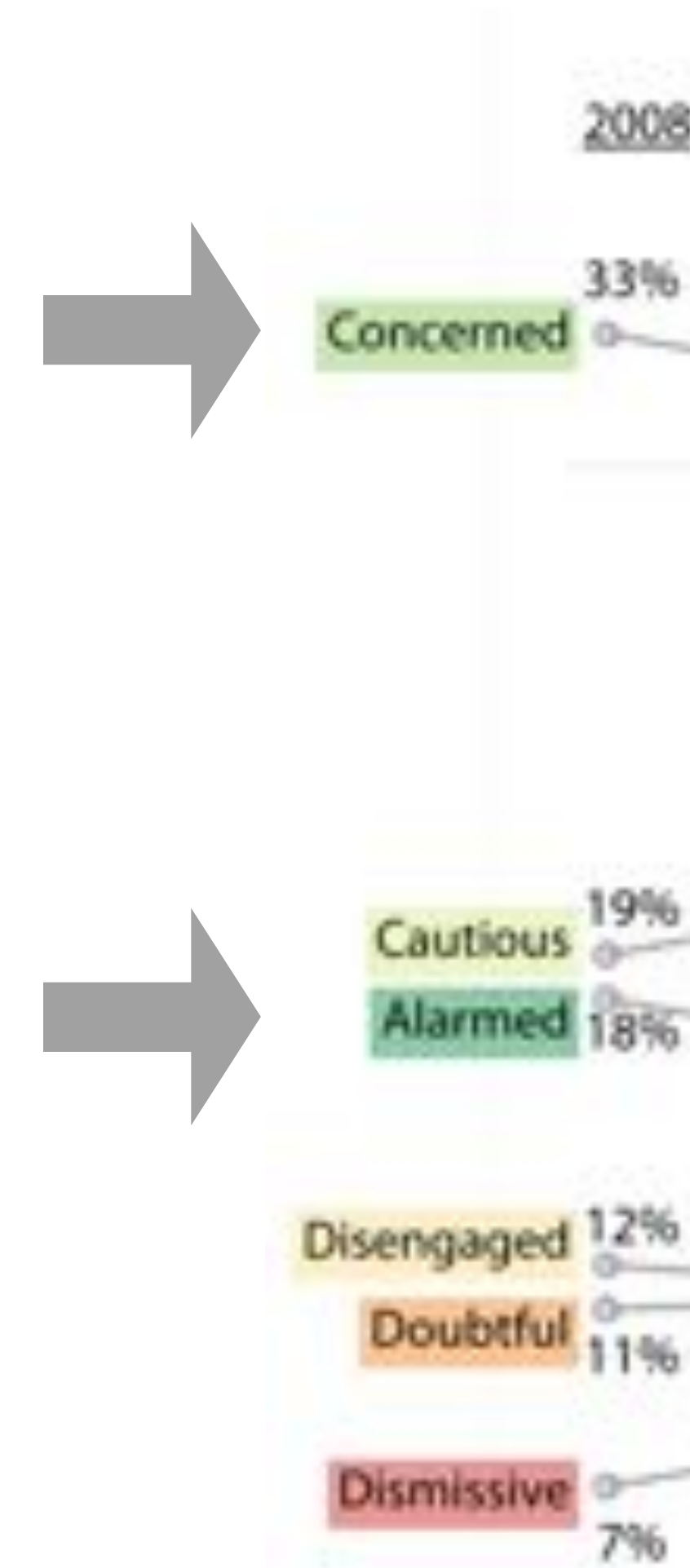
Global Warming's Six Americas



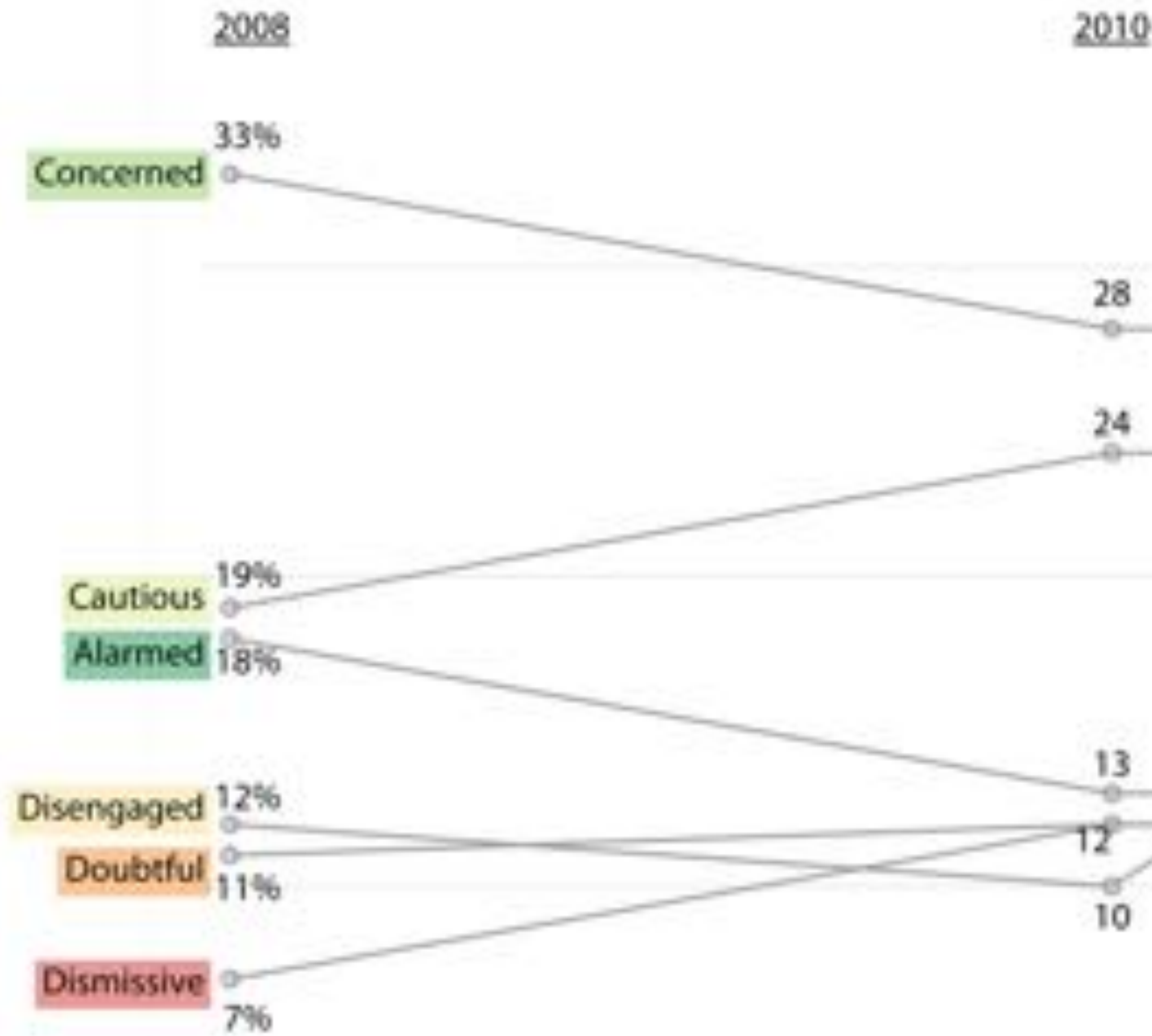
Six Americas Over Time



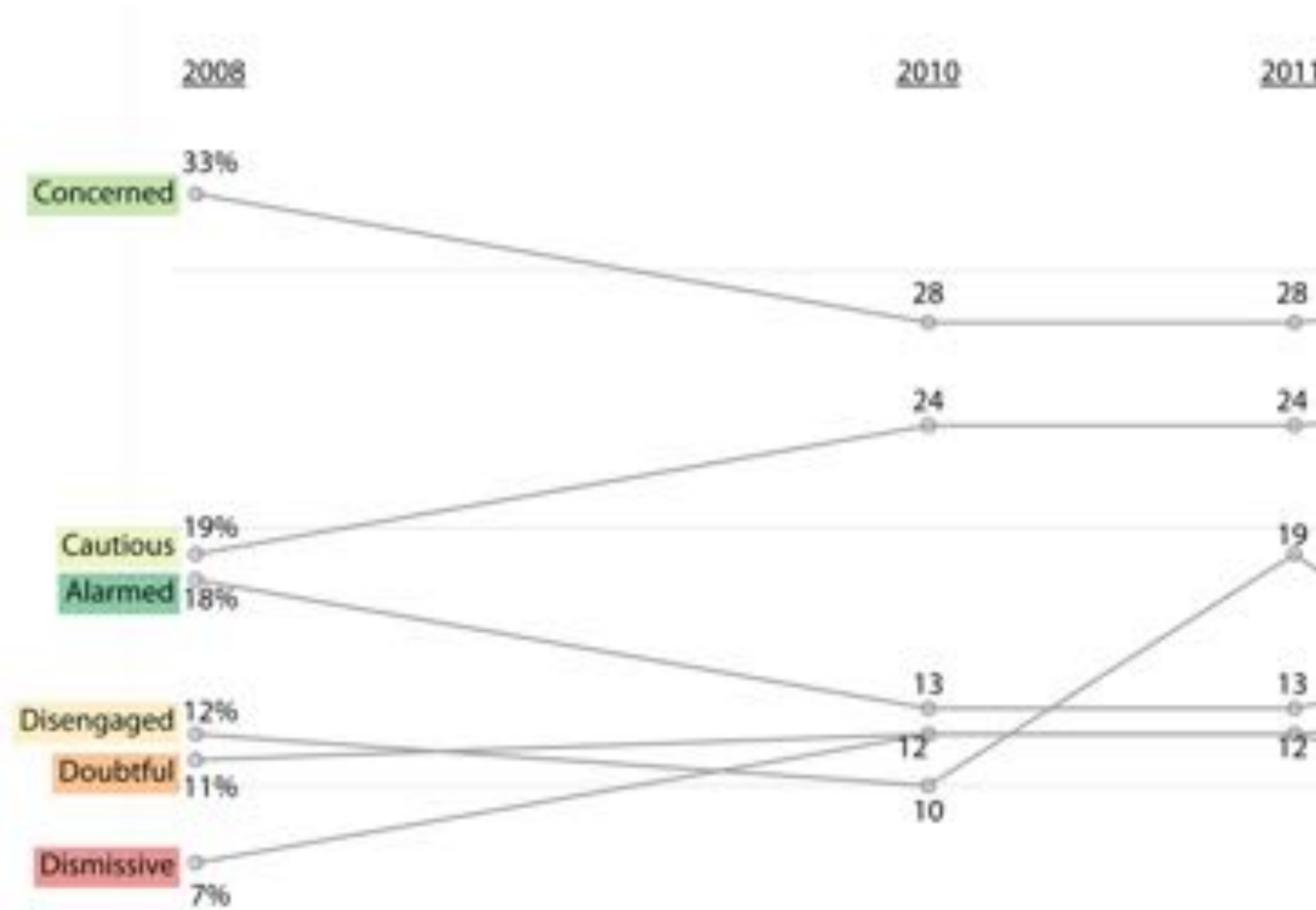
Six Americas Over Time



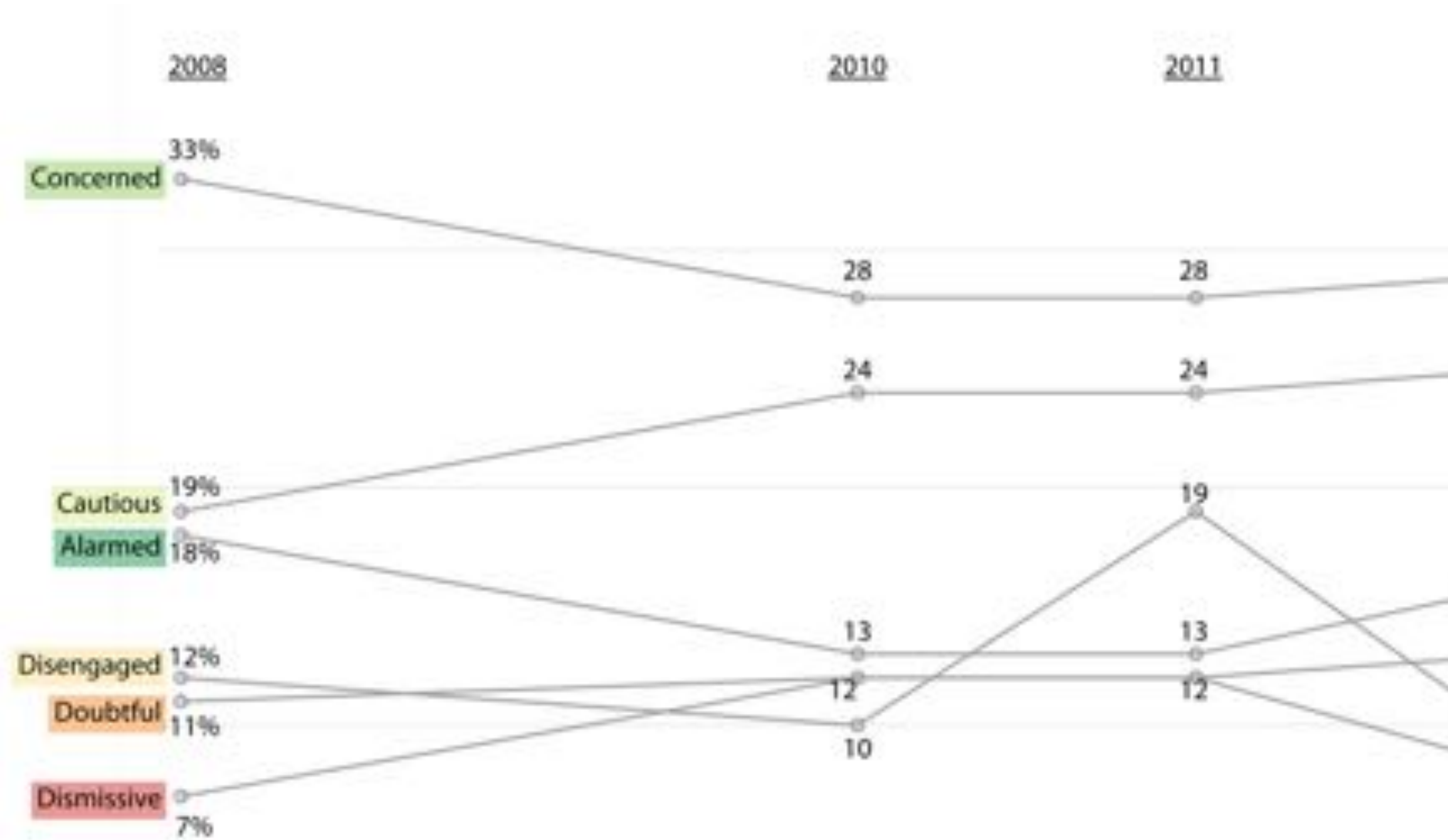
Six Americas Over Time



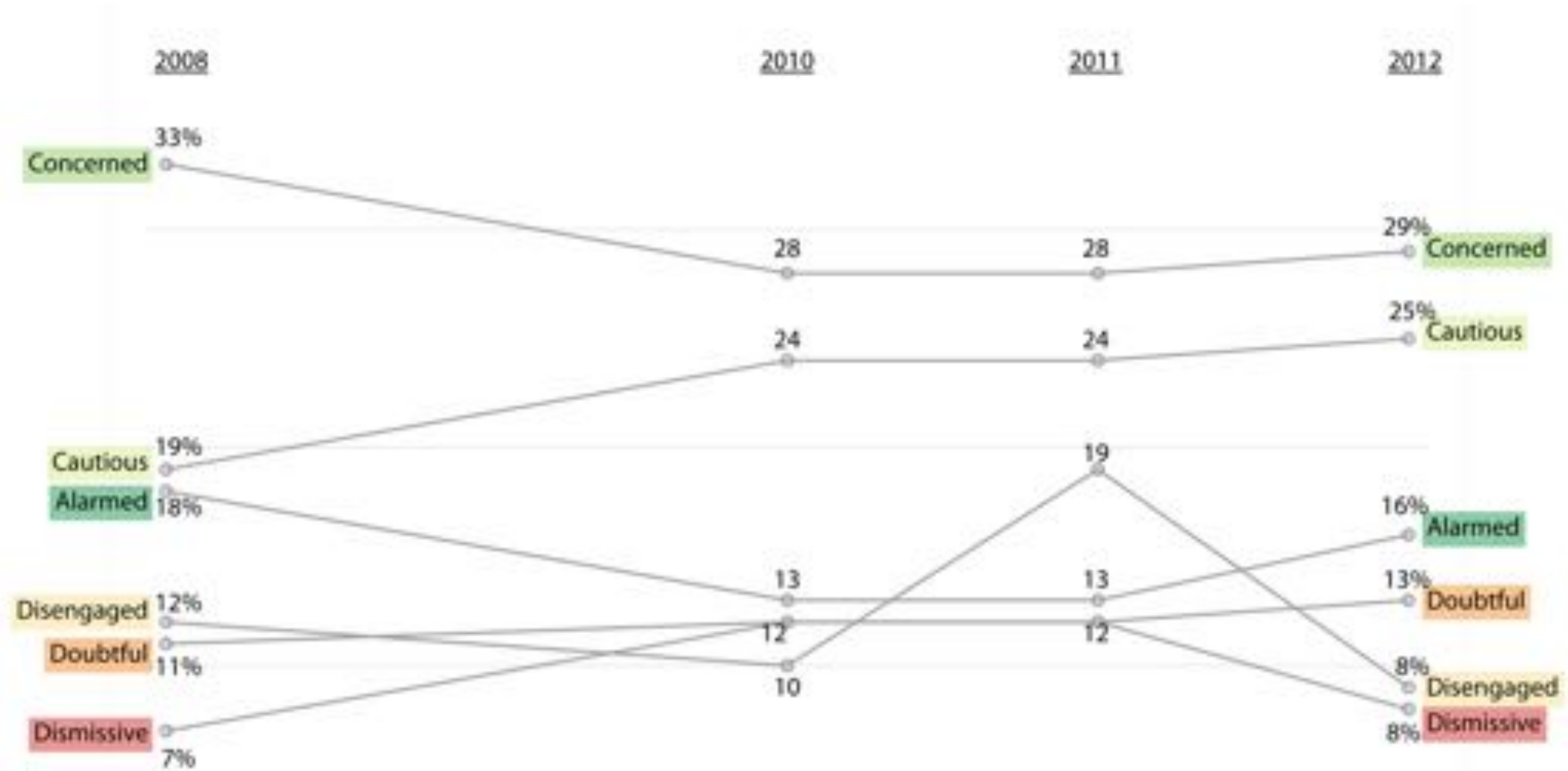
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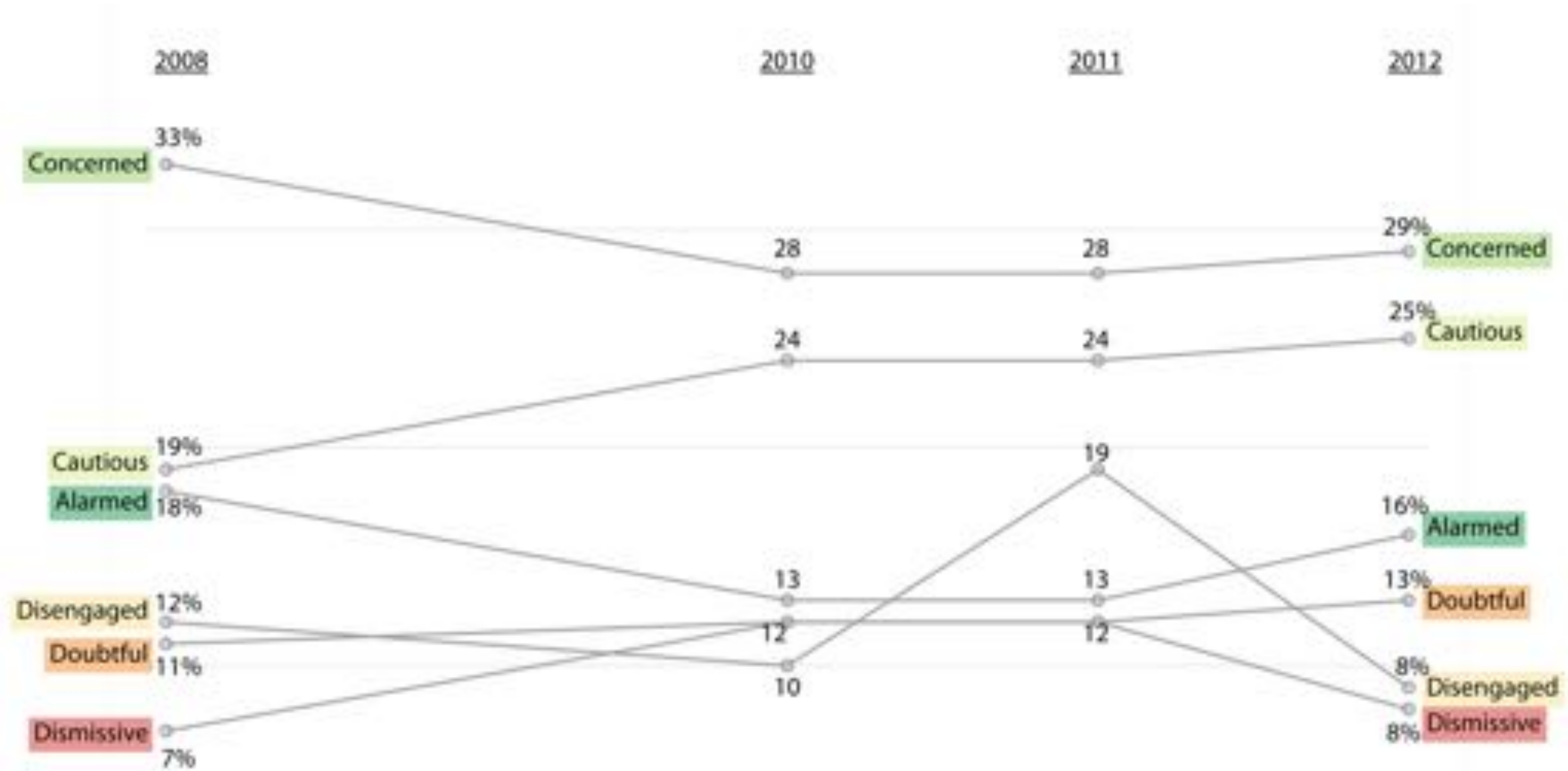
Six Americas Over Time



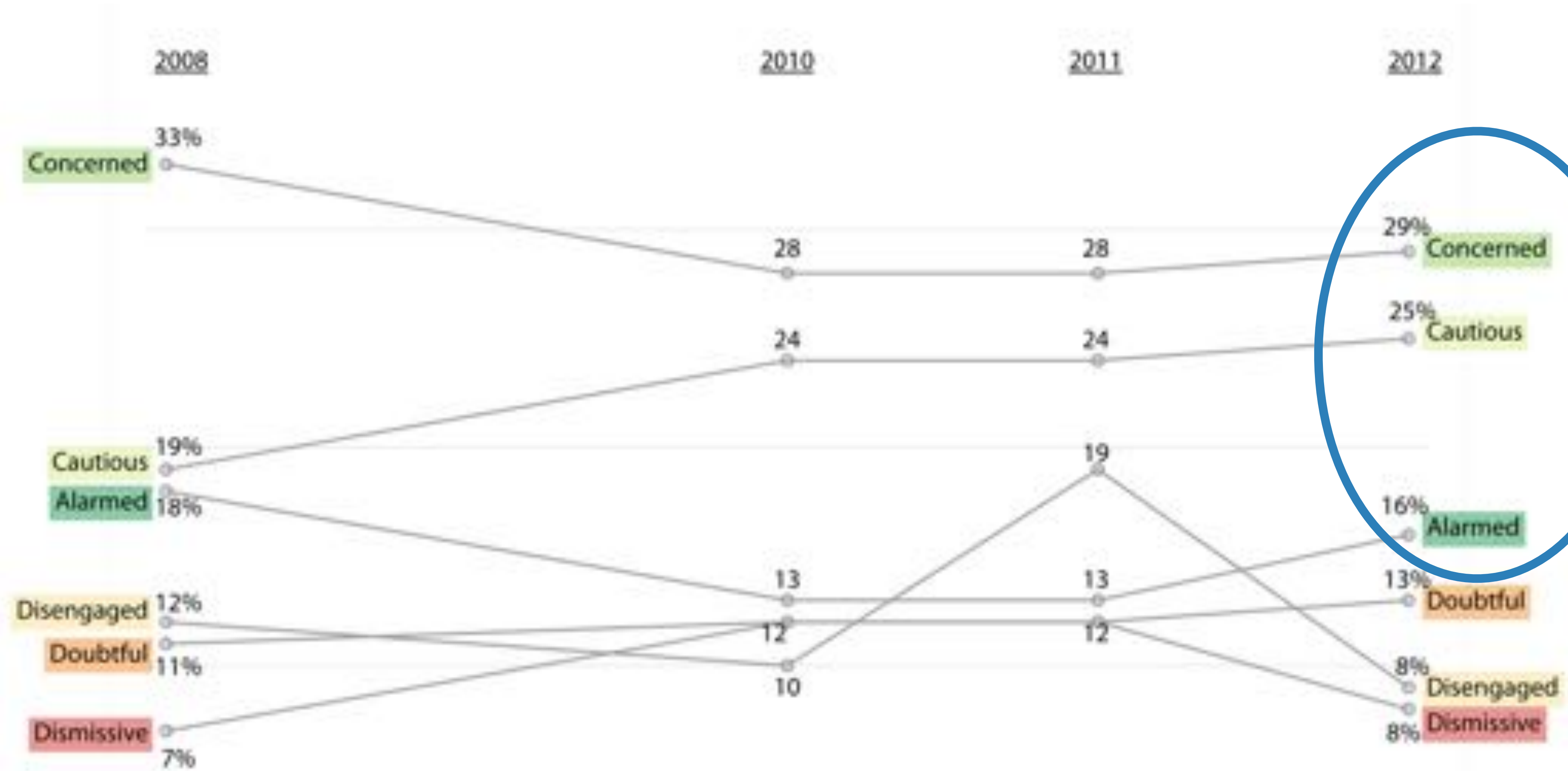
Six Americas Over Time

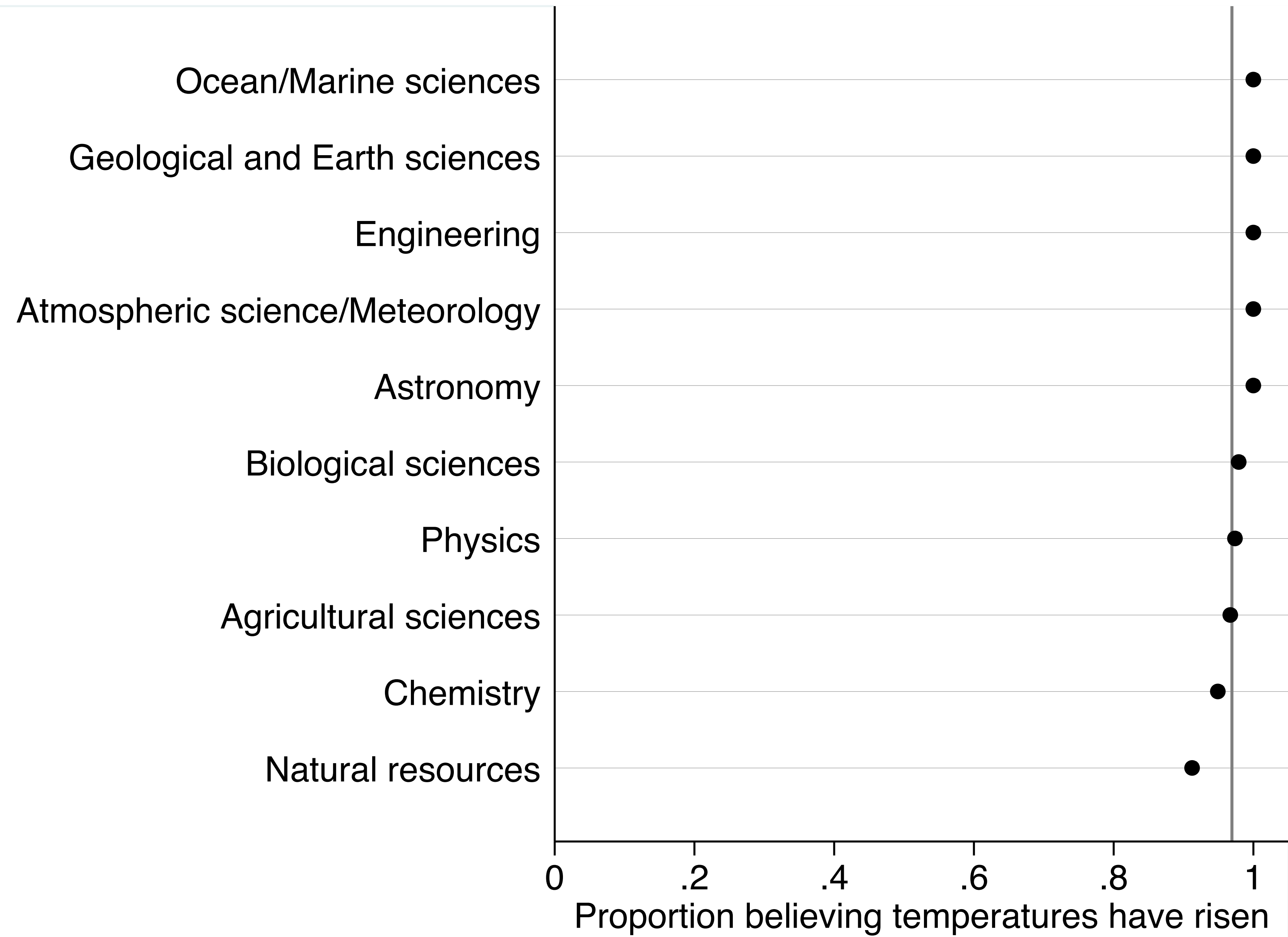


Six Americas Over Time



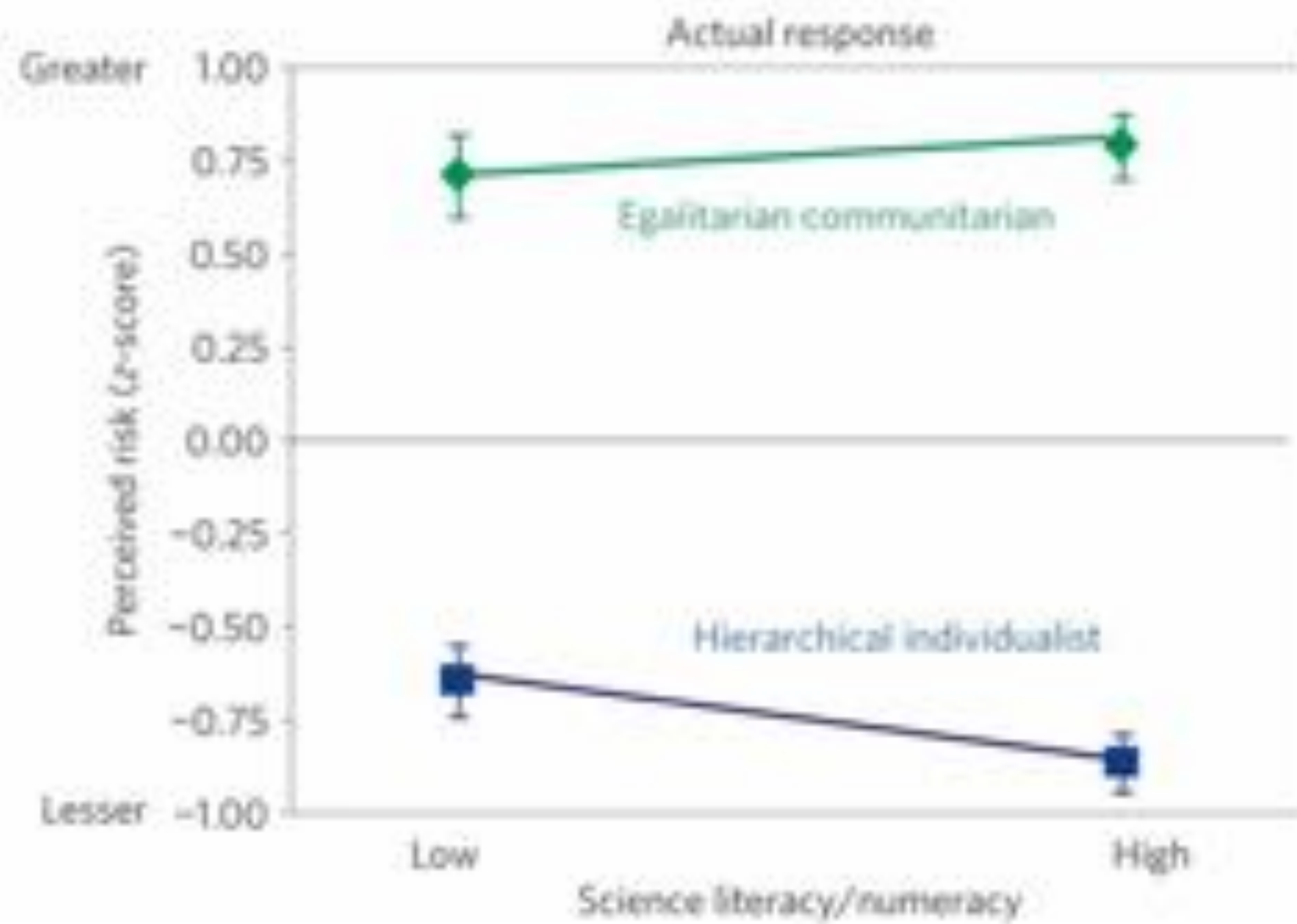
Six Americas Over Time



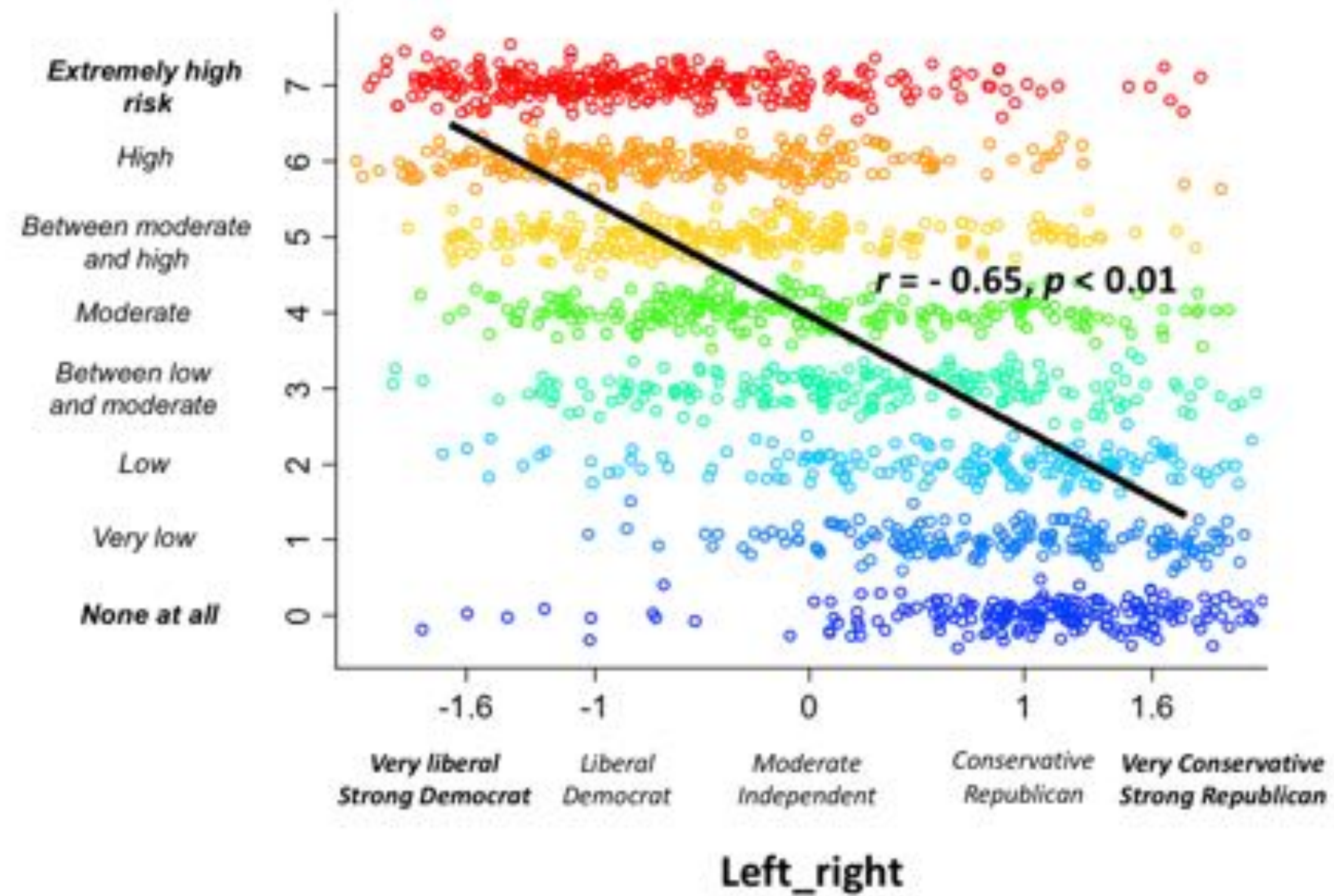


Source: Carlton et al. in review

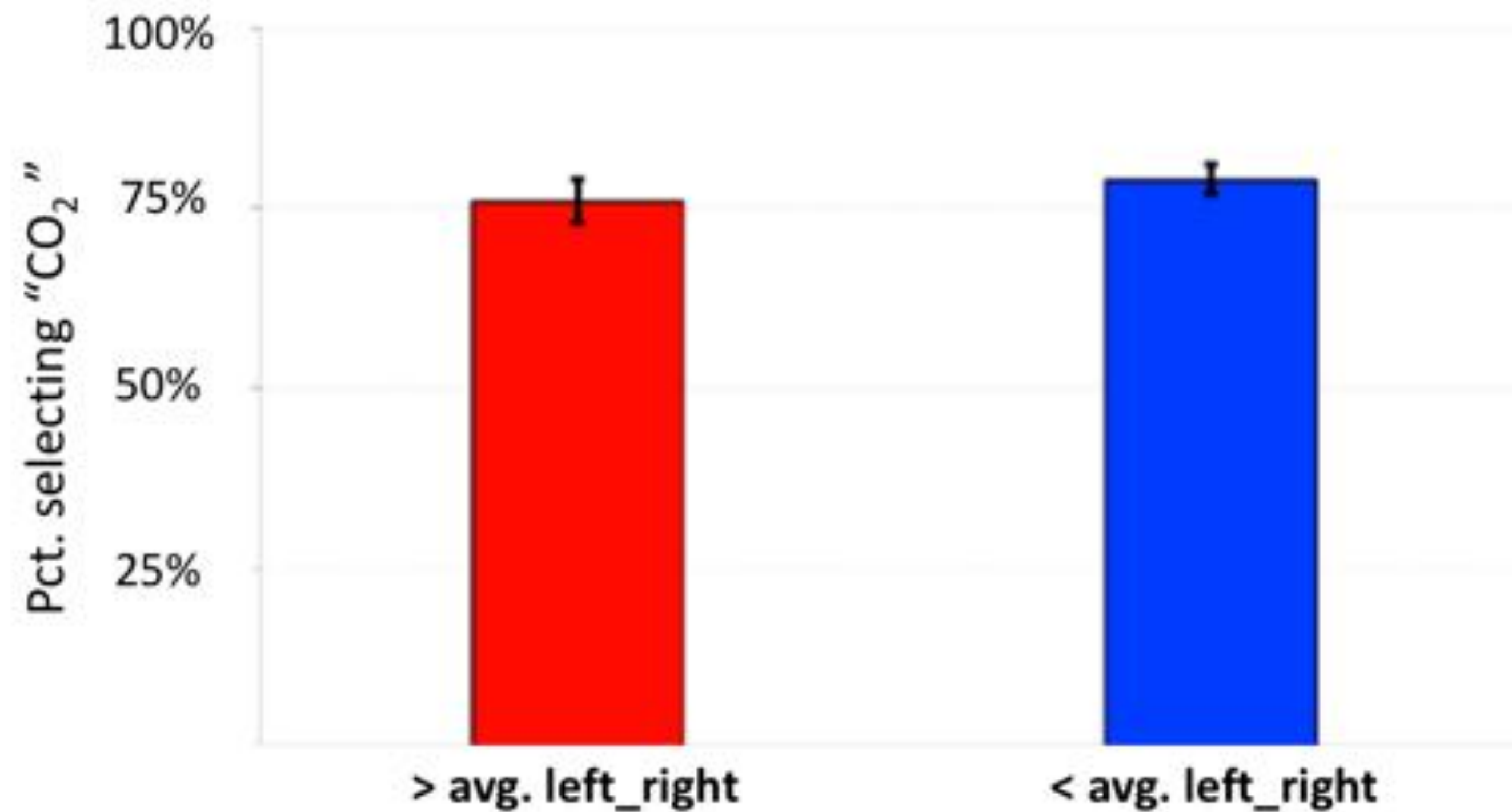
2. Lack of knowledge is not the (primary) problem



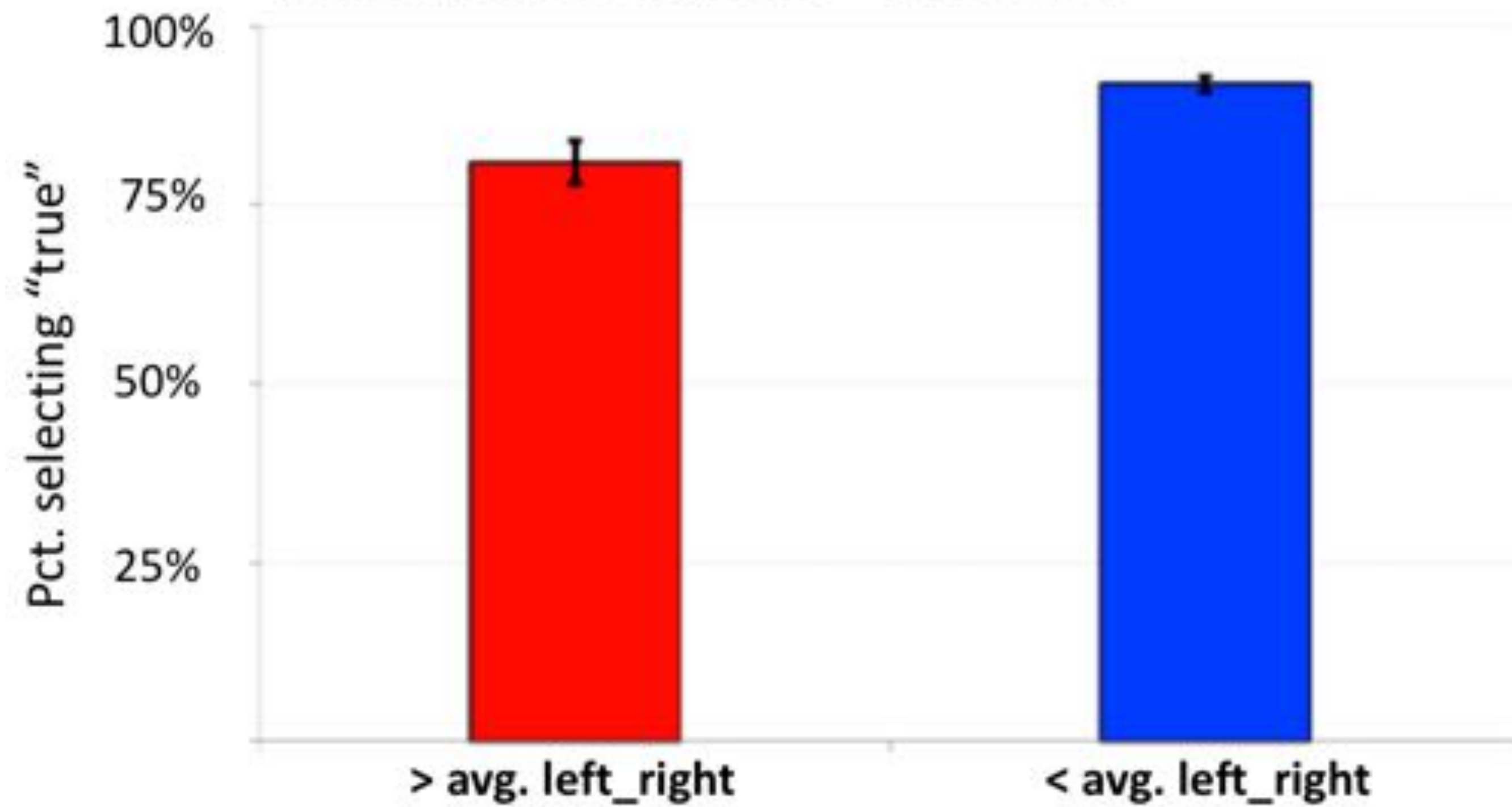
"How much risk do you believe **global warming** poses to human health, safety, or prosperity?"



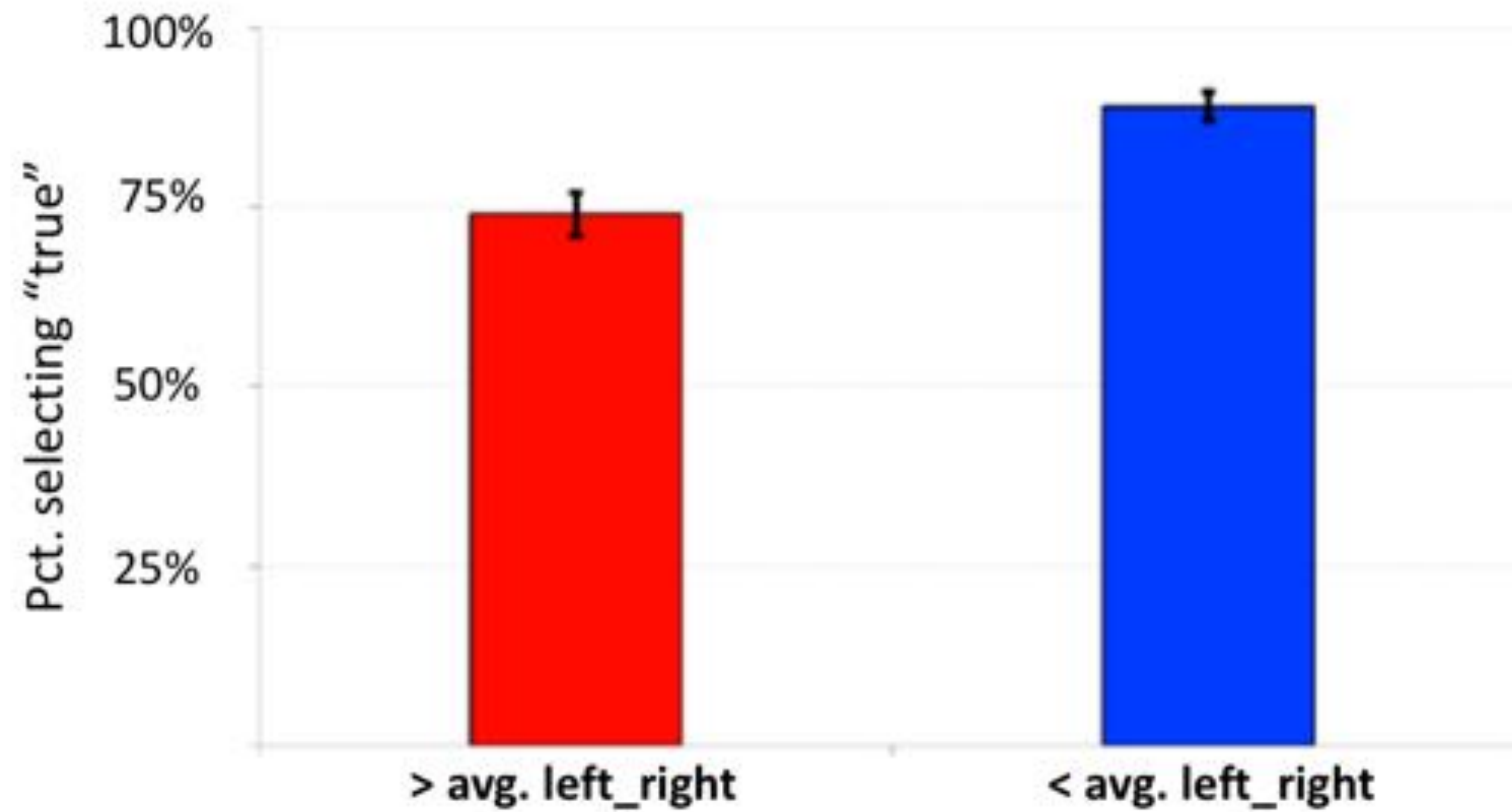
“What gas do most scientists believe causes temperatures in the atmosphere to rise? Is it [hydrogen, helium, carbon dioxide, radon]?”



“the increase of atmospheric carbon dioxide associated with the burning of fossil fuels will reduce photosynthesis by plants” [true false]

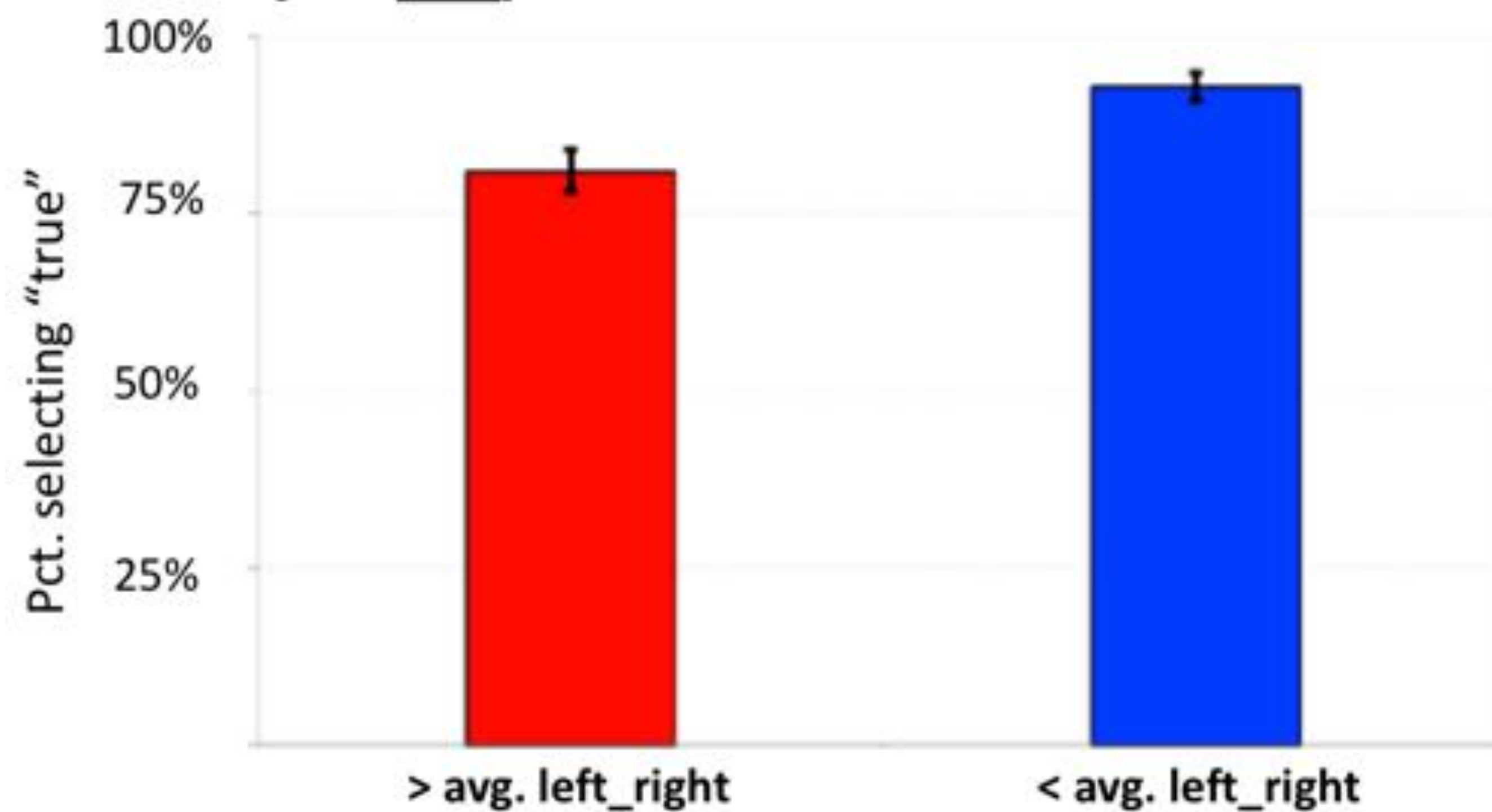


***“human-caused global warming will result in flooding
of many coastal region”*** [true false]

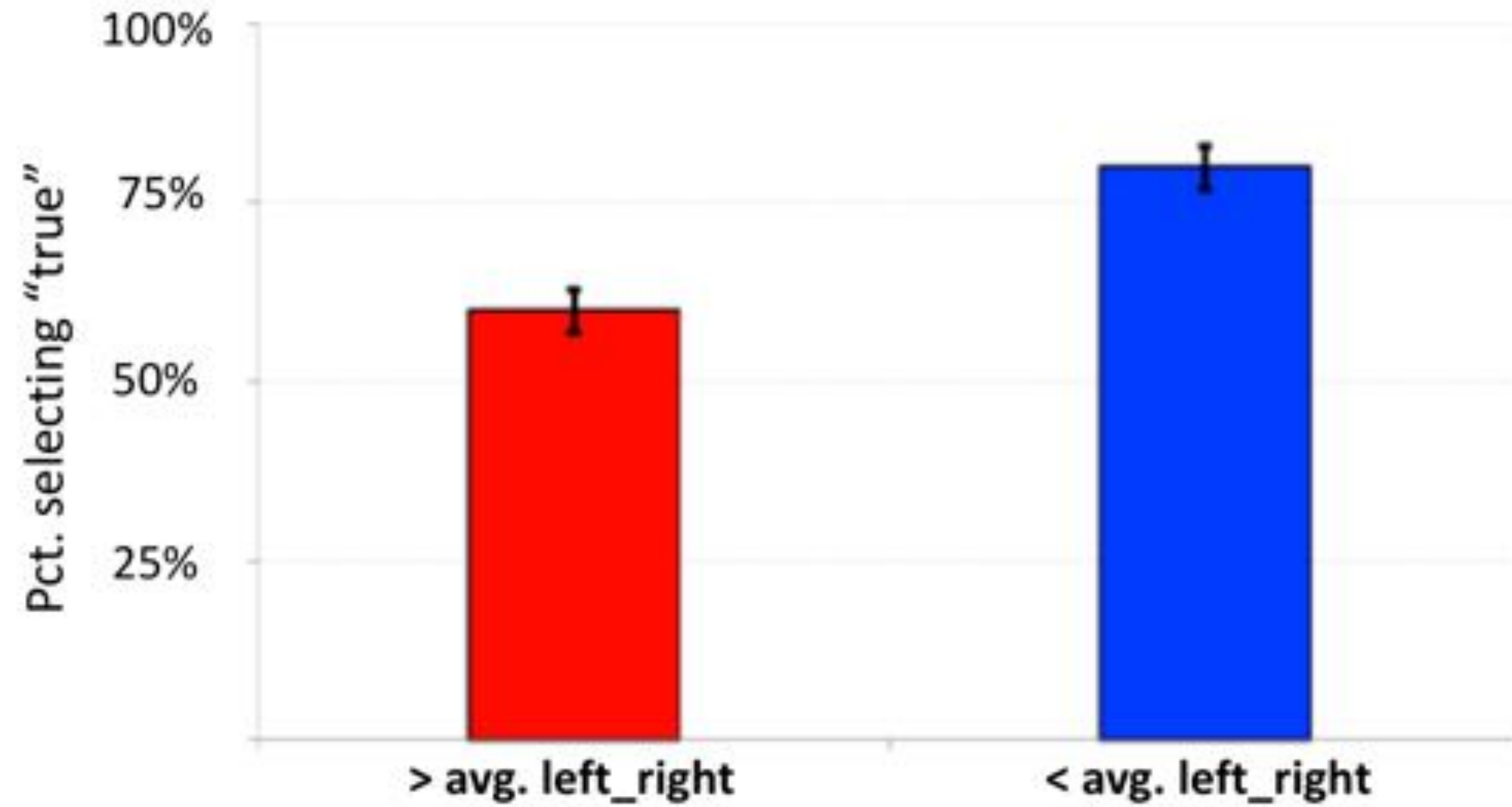


“if the North Pole icecap melted as a result of human-caused global warming, global sea levels would rise”

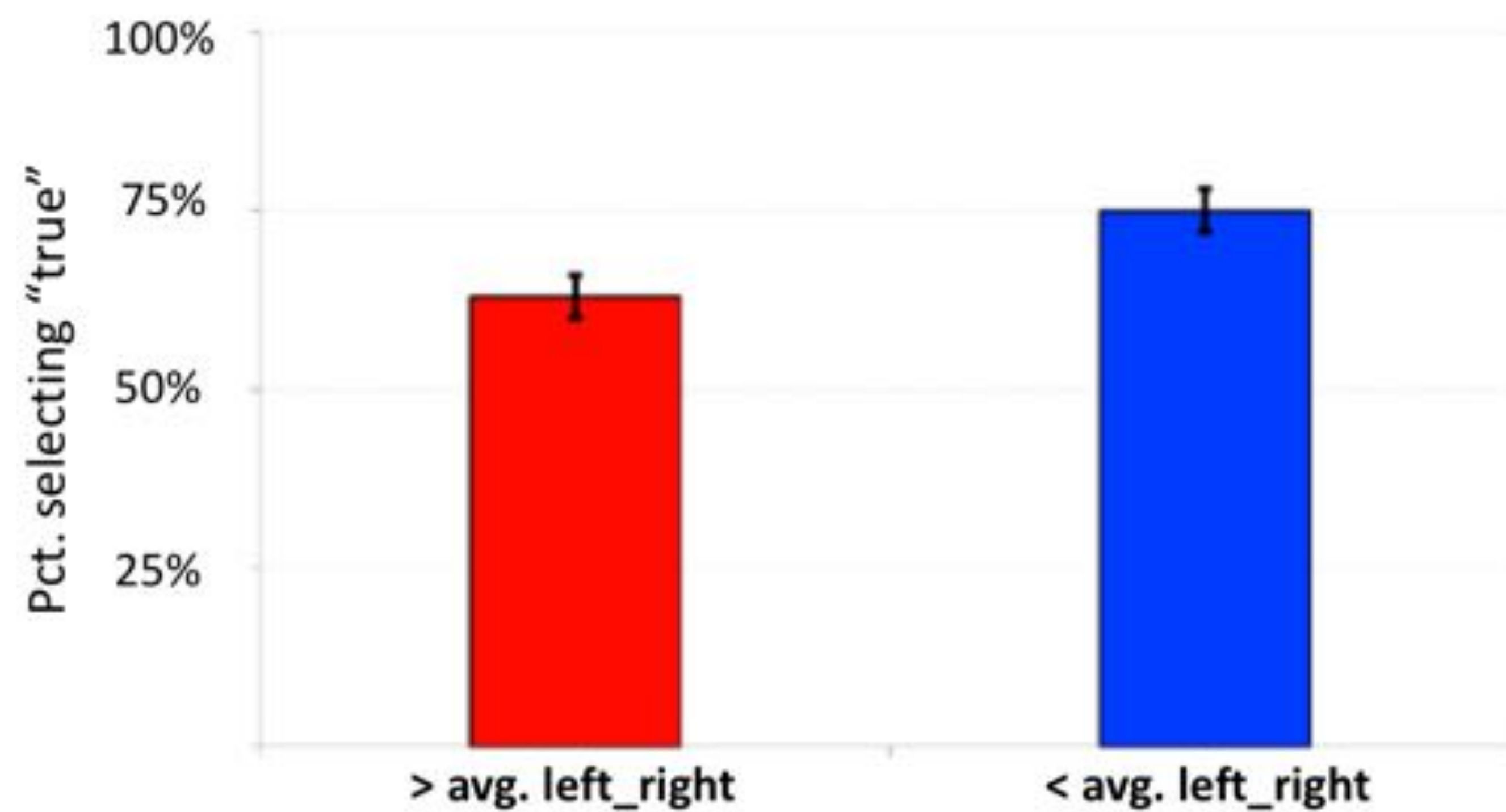
[true false]



“globally averaged surface air temperatures were higher for the first decade of the twenty-first century (2000-2009) than for the last decade of the twentieth century (1990-1999)” [true false]

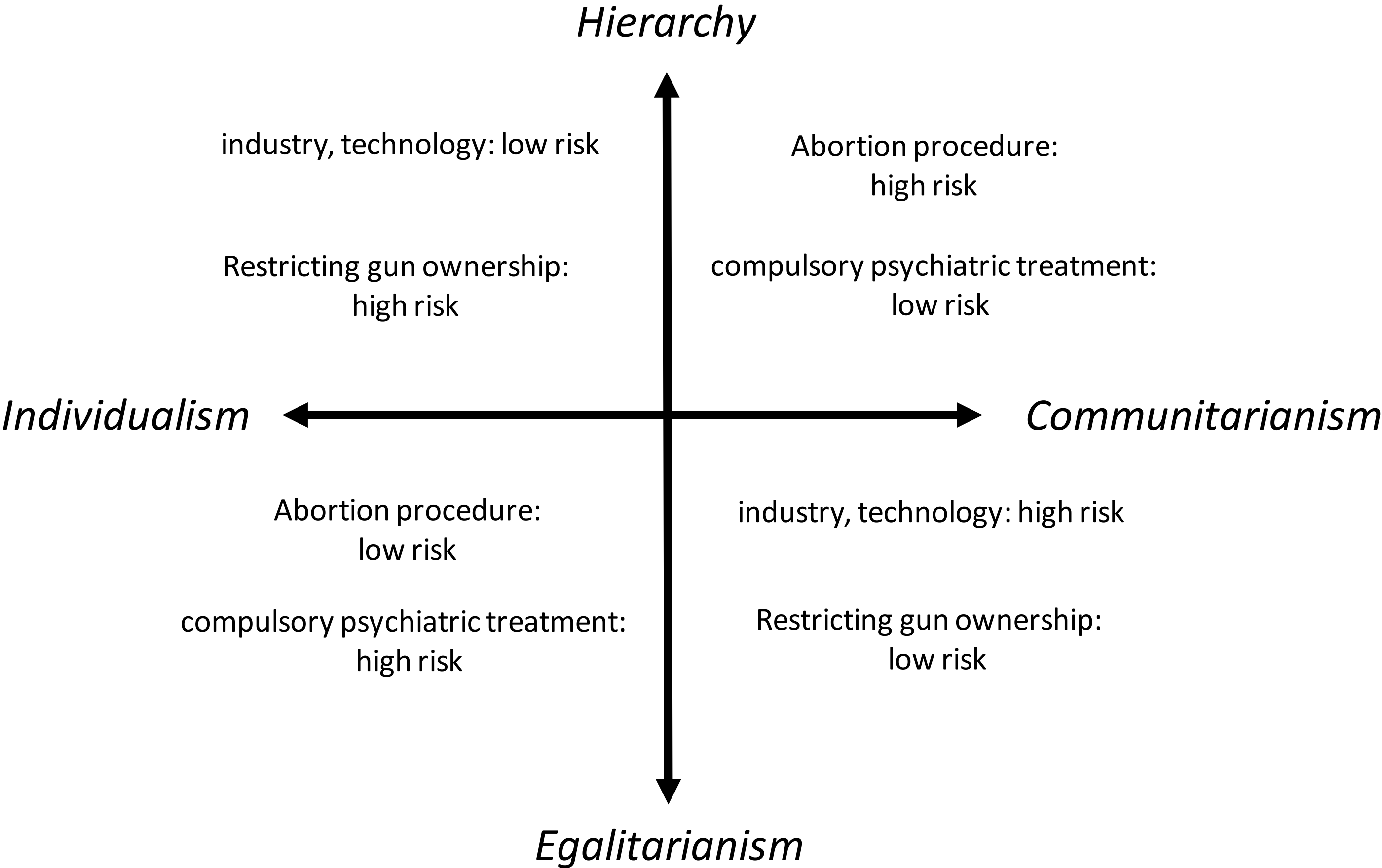


“human-caused global warming will increase the risk of skin cancer in human beings” [true false]

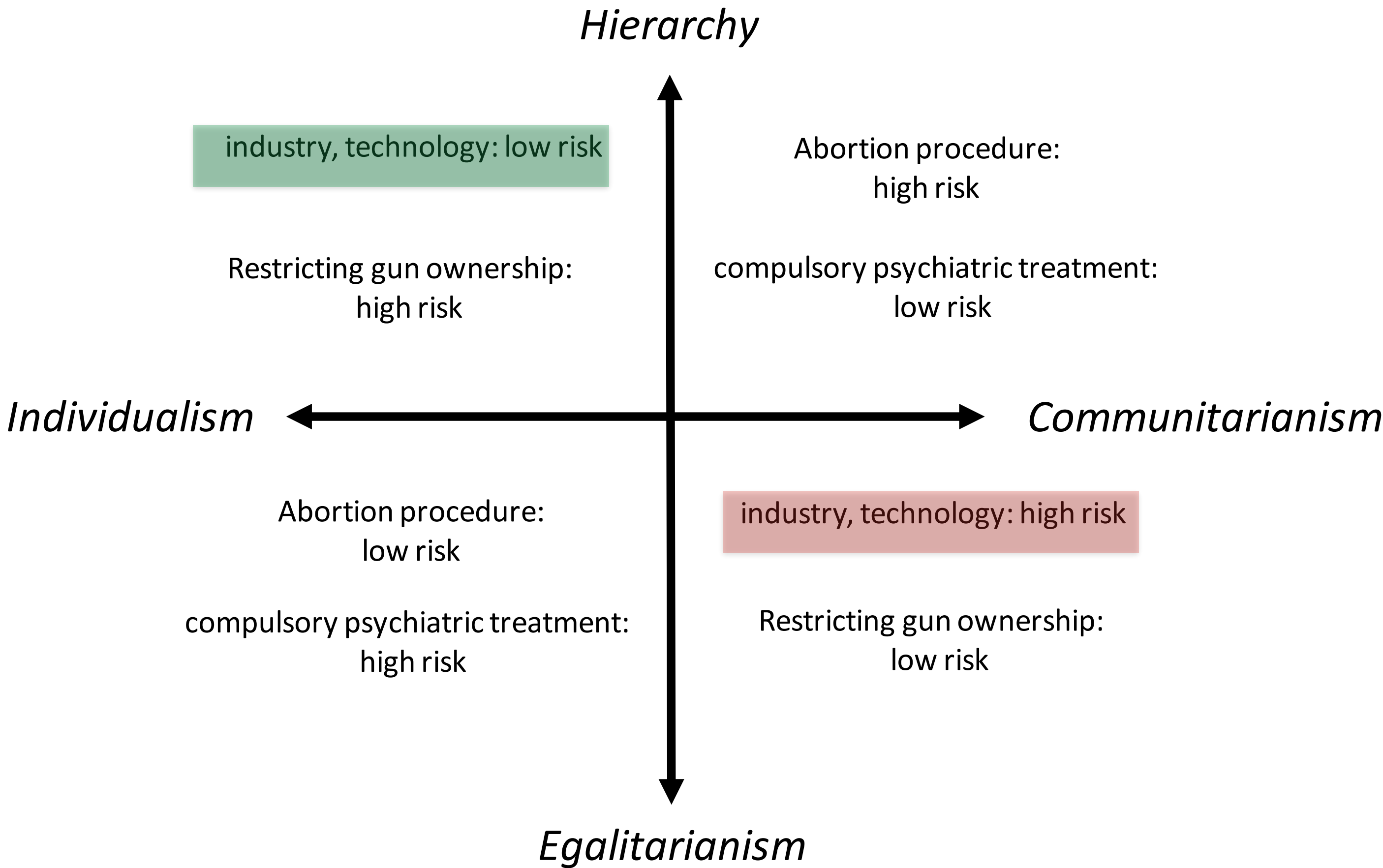


When people say they don't believe in climate change, they are expressing their **identity**, not their **knowledge**.

Cultural Cognition of Risk



Cultural Cognition of Risk



3. The human brain is hard-wired not to worry about climate change

R. Gifford 2011. *American Psychologist* 66: 290–302

The Dragons of Inaction

Psychological Barriers That Limit Climate Change Mitigation
and Adaptation

Robert Gifford
University of Victoria

Most people think climate change and sustainability are important problems, but too few global citizens engaged in high-greenhouse-gas-emitting behavior are engaged in enough mitigating behavior to stem the increasing flow of greenhouse gases and other environmental problems. Why is that? Structural barriers such as a climate-averse infrastructure are part of the answer, but psychological barriers also impede behavioral choices that would facilitate mitigation, adaptation, and environmental sustainability. Although many individuals are engaged in some ameliorative action, most could do more, but they are hindered by seven categories of psychological barriers, or “dragons of inaction”: limited cognition about the problem, ideological worldviews that tend to preclude pro-environmental attitudes and behavior, comparisons with key other people, sunk costs and behavioral momentum, discredence toward experts and authorities, perceived risks of change, and positive but inadequate behavior change. Structural barriers must be removed wherever possible, but this is unlikely to be sufficient. Psychologists must work with other scientists, technical experts, and policymakers to help citizens overcome these psychological barriers.

Keywords: climate change, barriers, obstacles, global warming, sustainability

It was our fault, and our very great fault—
and now we must turn it to use.
We have forty million reasons for failure,
but not a single excuse.
So the more we work and the less we talk
the better results we shall get . . .
—Rudyard Kipling, “The Lesson,” 1901

If so many people are concerned about climate change, the environment, and sustainability, why are more of us not doing what is necessary to ameliorate the problems? Of course, many individuals and organizations have already taken some steps in this direction, and some have taken many steps. However, in the aggregate, humans continue to produce massive quantities of greenhouse gases that will further drive climate change, and we continue to engage in other environmentally destructive behavior patterns.

In some cases, the reasons for this behavioral deficit are structural and therefore beyond an individual’s reasonable control. For example, low income severely limits one’s ability to purchase solar panels, living in a rural area usually means public transport does not exist as an alternative to driving, and living in a region with cold winters restricts one’s ability to reduce home-heating-based energy use. However, for almost everyone who is *not* severely restricted by structural barriers, adopting more pro-environmental choices and behaviors is possible, but this adoption is not occurring to the extent necessary to stem the increasing flow of greenhouse gases and other environmental damage. Thus, the question remains: What limits more widespread mitigation, adaptation, and sustainability actions on the part of individuals for whom such actions are feasible?

This article considers seven general psychological barriers as influences that limit environmental behavior change.¹ These barriers are my suggested elucidation of the hoary mystery surrounding the fabled gap between attitude (“I agree this is the best course of action”) and behavior (“but I am not doing it”) with regard to environmental problems. Some of the barriers are recognized in one psychological research domain or another, but others have not yet become part of our lexicon. Some have been researched (in other domains) much more than others. These barriers have not been considered as a group, although a few social scientists have discussed some of them (e.g., Gifford, 2008; Kollmuss & Agyeman, 2002; Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007).

Psychological Barriers to Behavior Change

Once one begins looking, quite a large number of psychological obstacles to adequate (carbon-neutral) climate change mitigation and adaptation may be found. This article arranges 29 of the “dragons of inaction” into seven

Correspondence concerning this article should be addressed to Robert Gifford, Department of Psychology, University of Victoria, Victoria, British Columbia V8S 2H1, Canada. E-mail: rgifford@uvic.ca

¹ These barriers may well limit change in other troublesome behavior domains, but a discussion of those domains remains for another time.

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- Limited cognition (biases, ignorance)
- Ideologies (system justification, technosalvation)
- Comparisons with others (norms, perceived inequity)
- Sunk costs (behavioral momentum)
- Discredence (mistrust, denial)
- Perceived risks (of changing behavior)
- Limited behavior (tokenism, rebound effect)



People tend to discount long-term threats



Immediate threats of climate change aren't readily apparent

Short-term needs take precedence: there's only so much worry to go around



**Abraham Maslow: *A theory of
human motivation* (1974)**



Maslow's hierarchy of needs



**Where do climate change
adaptation/mitigation fit in?**




Climate change is not
“available” for people to worry
about.

People are **hard-wired** not to
worry about climate change.

People are **hard-wired** not to
worry about climate change.



A large pile of golden corn under a clear blue sky. A person is standing on the peak of the pile, and a conveyor belt structure is visible on the left side. The scene is brightly lit, suggesting a sunny day.

2

things about **agriculture** that
make it worth studying.

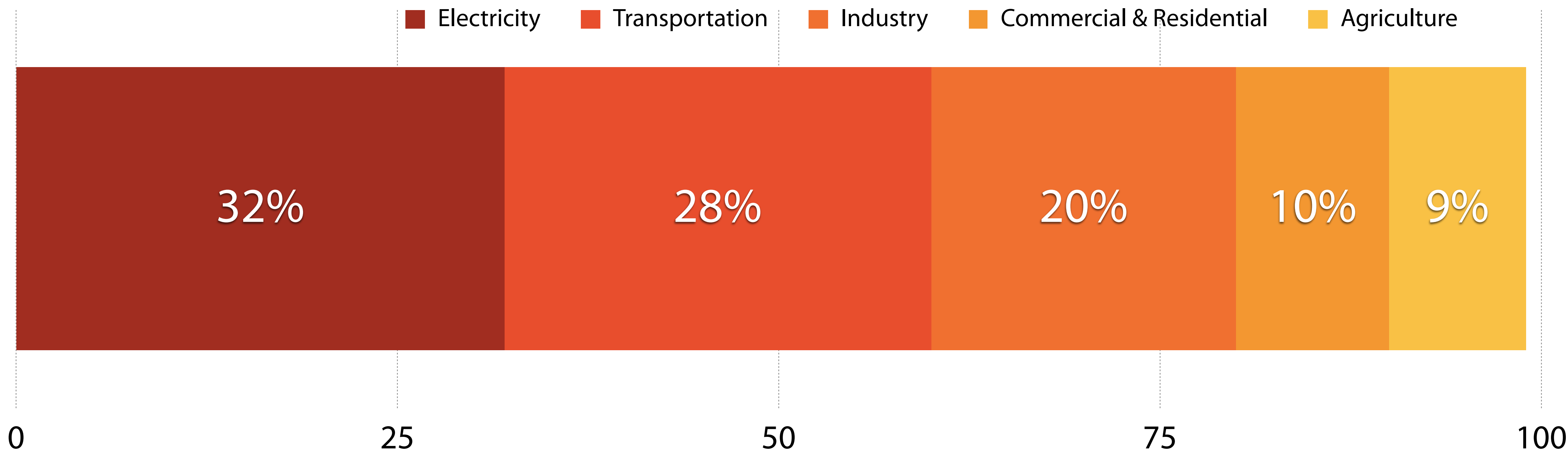
1. Agriculture is huge



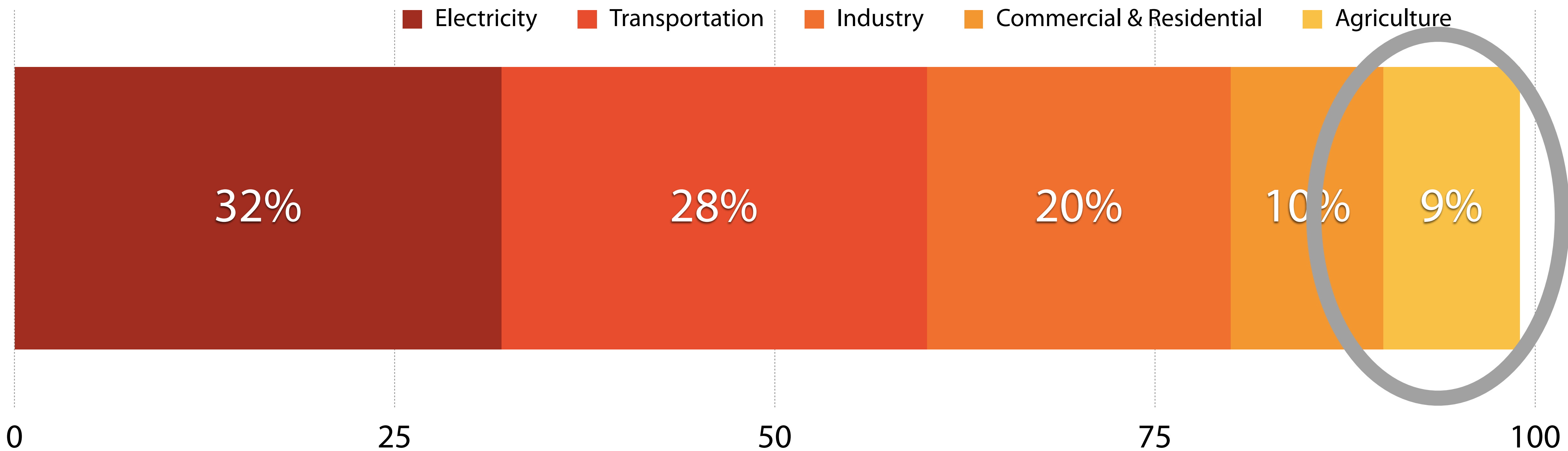
1% of US GDP value-added



2. Agriculture emits.



% of US GHG Emissions



% of US GHG Emissions

Data: EPA

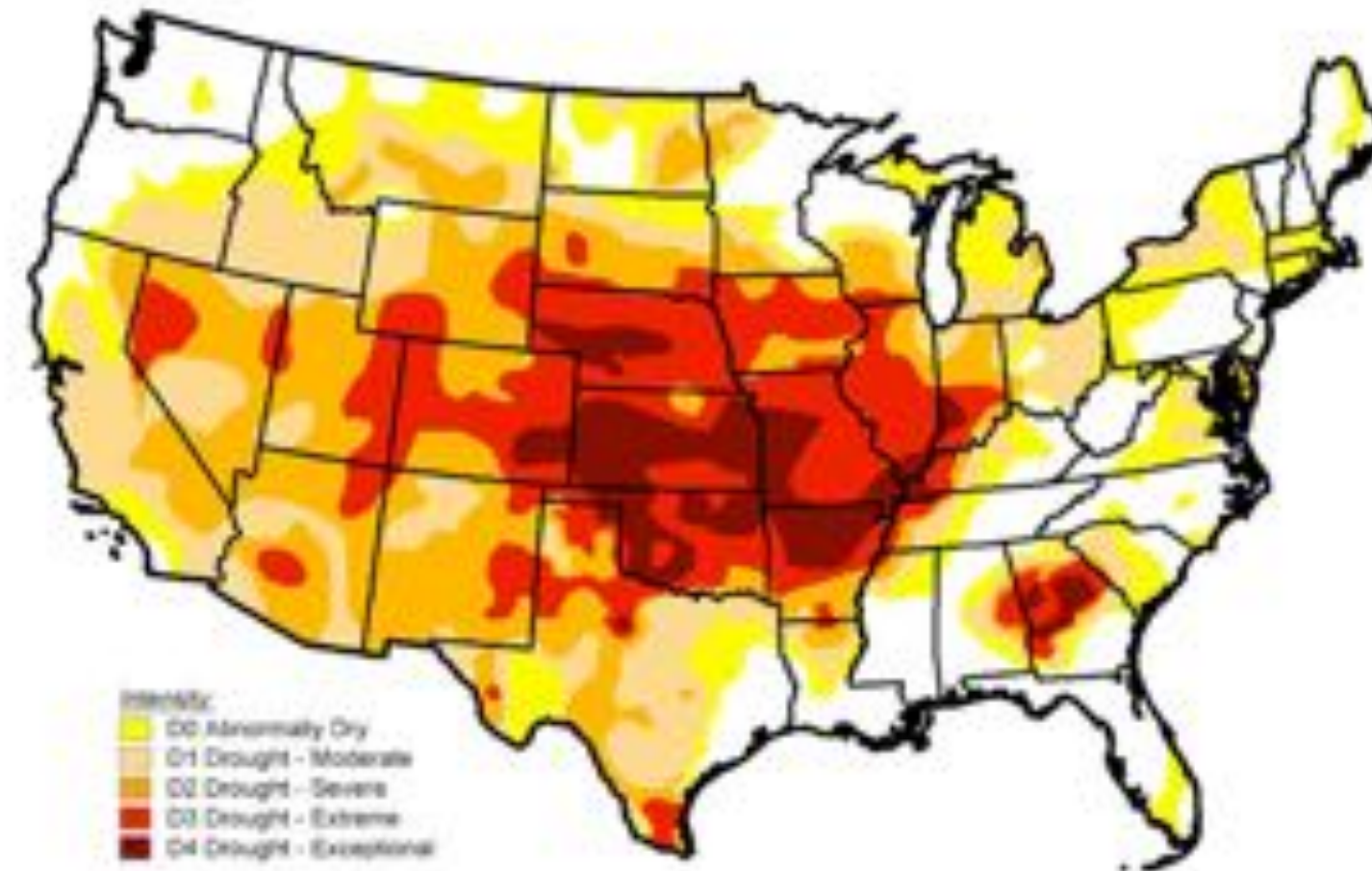
A close-up photograph of a male lion with a large, light-brown mane, roaring with its mouth wide open, showing its teeth and tongue. The lion is in a savanna environment with dry grass and a blue sky in the background.

People are **hard-wired** not to
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A close-up photograph of a male lion with a large, light-brown mane, roaring with its mouth wide open, showing its teeth and tongue. The lion is in a savanna environment with dry grass and a blue sky in the background.

**What if climate change were
more personal?**

The effects of the 2012 Midwestern US drought on climate change beliefs

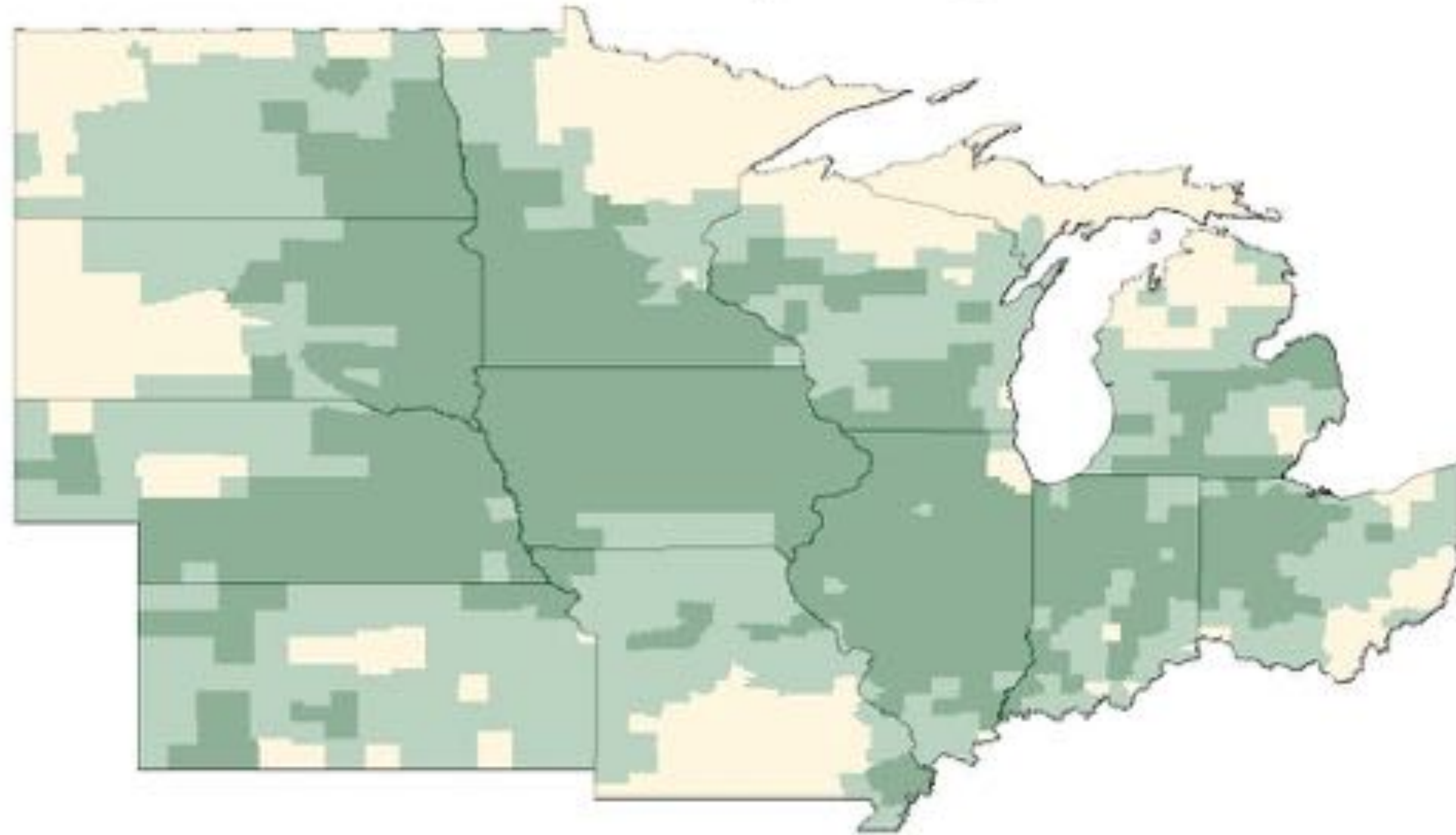




Useful 2 Usable

State climatologists, Crop modelers, Agronomists,
Economists, Social scientists, RCC staff



U2U Study Region

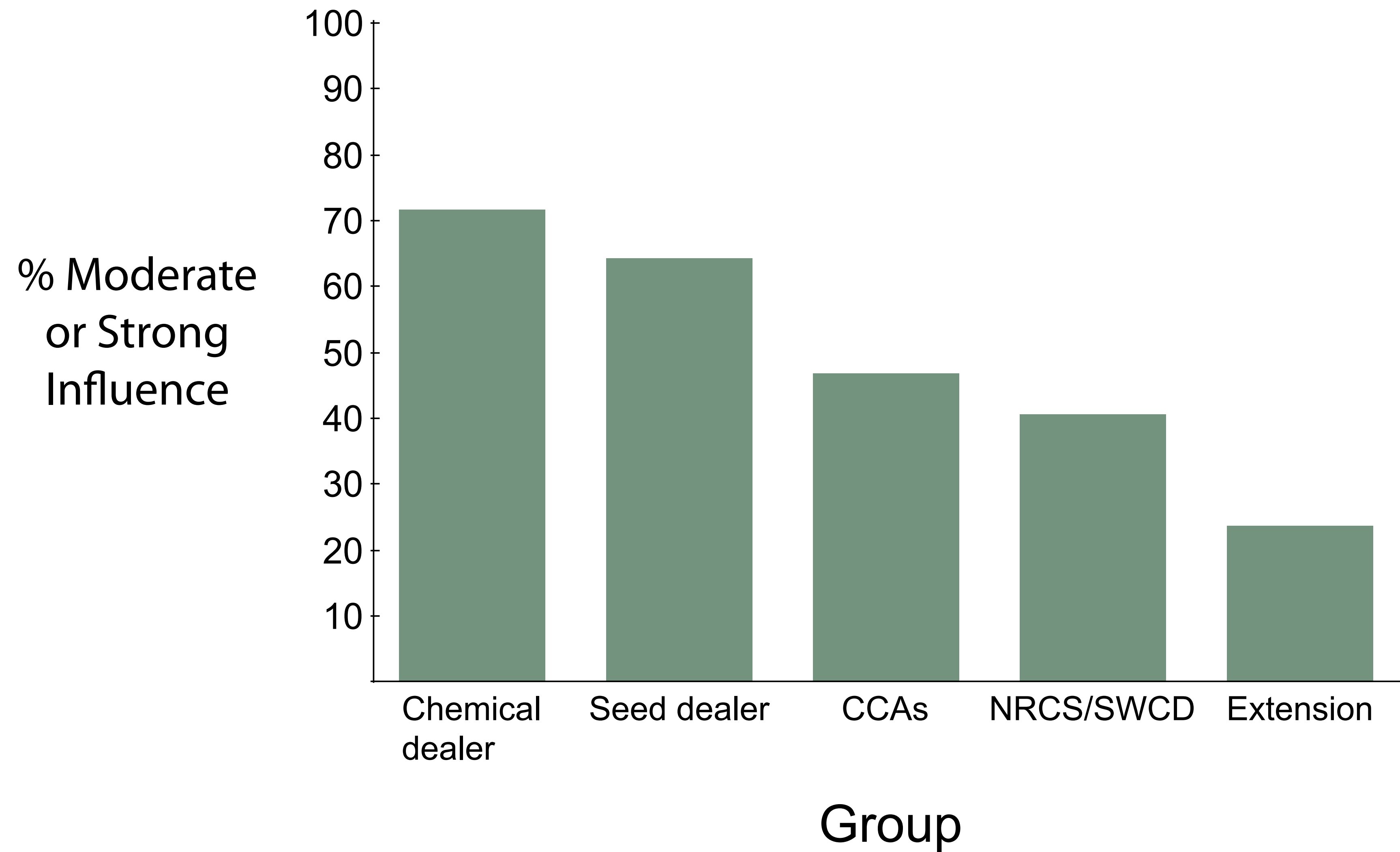


-  ***Major Corn Growing Area***
-  ***Minor Corn Growing Area***

- Nearly one-third of global supply
- Over \$50B to US economy

Agricultural Advisors:
key players in the
corn industry





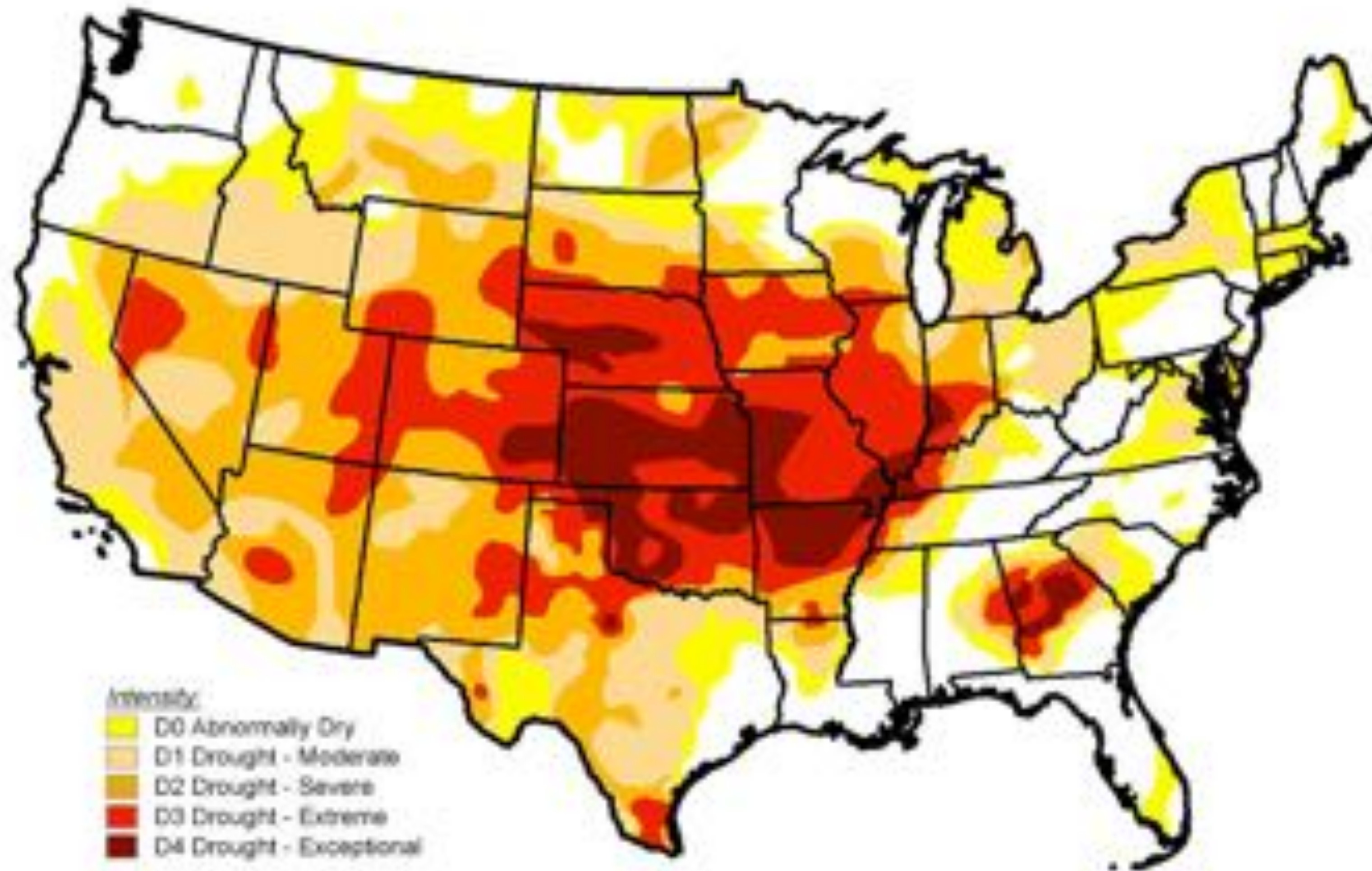
Source: Prokopy et al. unpublished data



2012 Advisor Survey:

- Climate Change Beliefs
- Risk Perceptions
- Attitudes toward climate adaptation

The 2012 drought: a research opportunity



The worst drought in 50+ years





Credit: NDJMom



Credit: UCAR



Did this extreme event
change climate beliefs?



What is the role of experience?

L. Whitmarsh. 2007. *Journal of Risk Research* 11: 351–374

Are flood victims more concerned about climate change than other people? The role of direct experience in risk perception and behavioural response

Lorraine Whitmarsh*

Tyndall Centre for Climate Change Research, School of Environmental Sciences, University of East Anglia, Norwich, UK

Climate change is a threat to human health and life, both now and in the future. Despite this, studies show that the public typically do not consider the issue a priority concern or a direct, personal threat. Furthermore, few are taking any preventive or protective action. Previous studies identify direct experience as a major influence on risk perception, learning and action. Drawing on such evidence, this paper focuses on the intangibility of climate change as a key impediment to personal engagement and explores whether relevant experiences of flooding and air pollution influence individuals' knowledge, attitudes, risk perception and behavioural responses to climate change. Perhaps surprisingly, interviews and a survey conducted in the south of England indicate flood victims differ very little from other participants in their understanding of and responses to climate change, but that experience of air pollution does significantly affect perceptions of and behavioural responses to climate change. Air pollution victims are no more likely to cite pollution as a cause of climate change than non-victims; but they do have higher pro-environmental values. Respondents with these values are significantly more likely to consider climate change a salient risk and to take action in response to it. Therefore the relationship between air pollution experience and responses to climate change may be indirect and mediated by environmental values. The paper concludes by highlighting implications of this research for developing climate change policies and strategies for public engagement.

Keywords: climate change; risk perception; experience; flooding; air pollution

Introduction

Mounting scientific evidence suggests climate change¹ is a significant threat both to humans and to the wider environment. Although there may be some benefits, most studies suggest impacts – such as increasingly extreme weather events, rising sea levels, flooding and droughts – will threaten human health and life (IPCC 2001a). Whilst developing countries may be more vulnerable to climate change, many severe impacts are likely to be experienced in Europe (Giorgi 2006). Furthermore, the threat of climate change is not only a future risk. Recent biological and climatic trends suggest human-induced climate change is already threatening both human and non-human life (e.g., Parmesan and Yohe 2003). In the UK, for example, both temperatures and periods of intense daily rainfall have been increasing over the past century, with recent flooding affecting many areas which have never been threatened before (Environment Agency 2001b).

*Email: l.whitmarsh@uea.ac.uk

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Are flood victims more concerned about climate change than other people? The role of direct experience in risk perception and behavioural response

Contrary to expectations, the research found that flood victims differ very little from other participants in their understanding of and response to climate change... Although flood victims are more likely to feel that climate change is an issue of personal importance, they are no more knowledgeable, concerned or active in relation to climate change than people without flooding experience.

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Spence et al. 2011. *Nature Climate Change* 1: 46–49.

Perceptions of climate change and willingness to save energy related to flood experience

A. Spence^{1★}, W. Poortinga², C. Butler³ and N. F. Pidgeon^{3★}

One of the reasons that people may not take action to mitigate climate change is that they lack first-hand experience of its potential consequences. From this perspective, individuals who have direct experience of phenomena that may be linked to climate change would be more likely to be concerned by the issue and thus more inclined to undertake sustainable behaviours. So far, the evidence available to test this hypothesis is limited, and in part contradictory^{1–4}. Here we use national survey data collected from 1,822 individuals across the UK in 2010, to examine the links between direct flooding experience, perceptions of climate change and preparedness to reduce energy use. We show that those who report experience of flooding express more concern over climate change, see it as less uncertain and feel more confident that their actions will have an effect on climate change. Importantly, these perceptual differences also translate into a greater willingness to save energy to mitigate climate change. Highlighting links between local weather events and climate change is therefore likely to be a useful strategy for increasing concern and action.

Climate change targets for reductions in greenhouse-gas emissions have now been instituted across many developed and developing nations. Research demonstrates that these targets are unlikely to be met without major changes in societal structures that will necessarily require engagement of the wider public, for example to achieve more efficient or reduced energy use^{5,6}. Although for many years a majority of individuals have expressed concern about climate change in the UK, as elsewhere, an examination of polling data in recent years actually reveals a small decline in concern, alongside an increase in scepticism regarding its seriousness and anthropogenic causes^{7–9}. Indeed, public perceptions typically reflect a much lower concern about climate change than is expressed by climate scientists, potentially owing, in part, to the public's lack of personal experience with climate impacts^{10,11}. Psychological research indicates that one reason for a lack of concern about climate change may be the perception that it is a distant issue. Lay people tend to perceive areas that are vulnerable to climate change impacts as geographically distant—at least in Western countries^{12,13}. This relates to research within the domain of embodied social cognition that links distance, and in particular spatial distance, with the dampening of reactions and judgements¹⁴.

These observations logically lead to the idea that highlighting the links between local events and climate change may encourage people to engage with the issue¹⁵ and to take action to mitigate potential impacts. Indeed, personal experience is thought to be a key driver of risk perceptions, and the perceived likelihood of a risk is found to increase if it has recently been experienced or can readily be imagined¹⁶. Relating local events to climate change may also have perceptual and behavioural impacts to the extent that these help to

make the issues less distant and more tangible. It might be expected that experiencing some kind of (generally negative) event that could be attributed to climate change would leave people feeling helpless. However, goal-setting theory¹⁷ highlights the benefits of setting concrete, specific goals in increasing instrumentality (that is, an individual's belief that actions will lead to outcomes) and the likelihood of subsequent action being taken. In line with this, if people are better able to relate to the potential consequences of climate change impacts, they may also be more likely to feel that their behaviour can lead to changes in these impacts.

Climate change itself is not directly observable by individuals, it being a reference to average climate conditions over a long period of time rather than that observed on a daily or seasonal basis, and is perhaps really understood only through mathematical models and scientific measurement¹⁸. However, given that seasonal events and the weather are the primary means by which individuals can experience and observe the climate, it is understandable that this is a means by which people may judge climate change. Note that phenological research (the recording of seasonal events), for example the early arrival of swifts in summer in the UK, and indigenous observations within key areas, for example reduction in numbers of seals within Arctic regions, have proved useful in verifying, clarifying and documenting impacts of climate change¹⁹.

Major extremes in weather, and ecosystem changes, are already being experienced across multiple geographical regions (for example, droughts in Uganda and Sudan) and are expected to increase in frequency and severity as a result of climate change²⁰. In particular, for many places including the UK, it is observed that periods of intense rainfall have increased in frequency over the past 40–60 years, resulting in a greater number of floods, and indeed recent research has explicitly linked anthropogenic greenhouse-gas emissions to an increase in flood risk in England and Wales²¹. It is important to acknowledge that climate change predictions highlight the increasing risk of particular weather patterns and events²². Hence, attributing any one event to climate change is highly complex, and as a consequence it is particularly difficult for communicators or the public to link actual experiences with the more abstract notions of risk derived from climate science. On this issue, some commentators have suggested that the substantial changes to the composition of the world's atmosphere mean that it is perhaps now more appropriate to discuss weather events in terms of hybrid weather; that is, as the result of a new co-produced natural–cultural climate system²³.

Existing research indicates that environmental views and perceptions of climate change can be related to individuals' physical surroundings and experiences. People who inhabit places recognized as physically vulnerable to climate change impacts in certain overt ways, for example living in low-lying coastal areas,

¹Horizon Digital Economy Research/School of Psychology, University of Nottingham, Nottingham NG7 2TU, UK, ²Welsh School of Architecture/School of Psychology, Cardiff University, Cardiff CF10 3AT, UK, ³Understanding Risk Research Group, School of Psychology, Cardiff University, Cardiff CF10 3AT, UK. ★e-mail: alexa.spence@nottingham.ac.uk; PidgeonN@Cardiff.ac.uk.

Perceptions of climate change and willingness to save energy related to flood experience

A. Spence^{1★}, W. Poortinga², C. Butler³ and N. F. Pidgeon^{3★}

One of the reasons that people may not take action to mitigate climate change is that they lack first-hand experience of its potential consequences. From this perspective, individuals who have direct experience of phenomena that may be linked to climate change would be more likely to be concerned by the issue and thus more inclined to undertake sustainable behaviours. So far, the evidence available to test this hypothesis is limited, and in part contradictory^{1–4}. Here we use national survey data collected from 1,822 individuals across the UK in 2010, to examine the links between direct flooding experience, perceptions of climate change and preparedness to reduce energy use. We show that those who report experience of flooding express more concern over climate change, see it as less uncertain and feel more confident that their actions will have an effect on climate change. Importantly, these perceptual differences also translate into a greater willingness to save energy to mitigate climate change. Highlighting links between local weather events and climate change is therefore likely to be a useful strategy for increasing concern and action.

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What gives?





2012 Advisor Survey:

- Climate Change Beliefs
- Risk Perceptions
- Attitudes toward climate adaptation



Unprecedented baseline data.



So let's do it again.



2013 Advisor Survey:

- Climate change beliefs
- Risk perceptions
- Attitudes toward climate adaptation
- *Experience with the drought*



3 hypotheses (based on SARF and RAA):



3 hypotheses (based on SARF and RAA):



3 hypotheses (based on SARF and RAA):

H1: Belief in climate change will have increased



3 hypotheses (based on SARF and RAA):

H1: Belief in climate change will have increased



3 hypotheses (based on SARF and RAA):

H1: Belief in climate change will have increased

H2: Risk perceptions will have increased



3 hypotheses (based on SARF and RAA):

H1: Belief in climate change will have increased

H2: Risk perceptions will have increased



3 hypotheses (based on SARF and RAA):

H1: Belief in climate change will have increased

H2: Risk perceptions will have increased

H3: Willingness to use climate information will have increased



2013 Advisor Survey:



2013 Advisor Survey:

- Administered electronically to ~7500 advisors



2013 Advisor Survey:

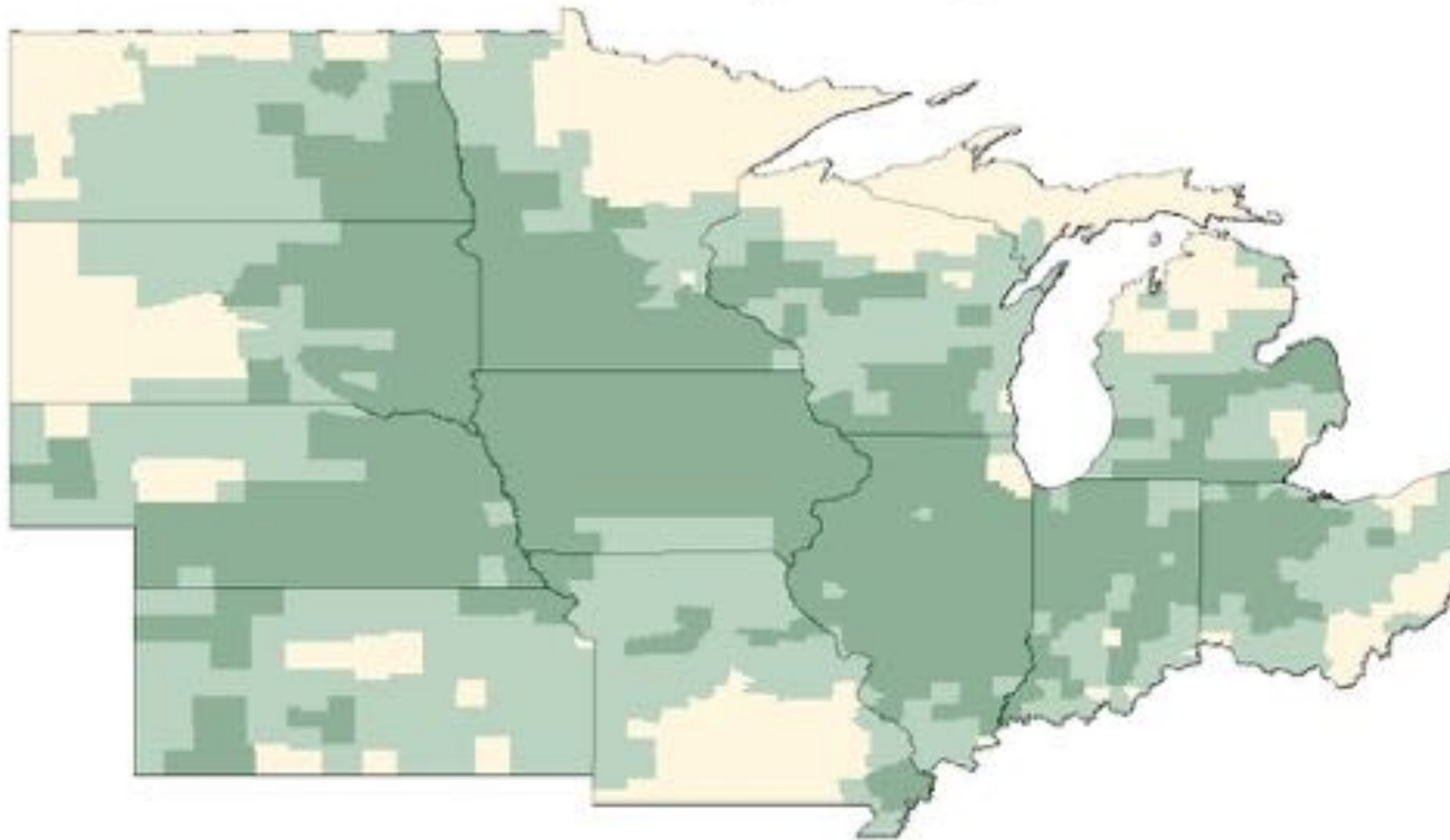
- Administered electronically to ~7500 advisors
- ~25% response rate





2013 Advisor Survey:

- Administered electronically to ~7500 advisors
- ~25% response rate
- 864 repeat respondents

U2U Study Region



 ***Major Corn Growing Area***
 ***Minor Corn Growing Area***

Survey administered in
Indiana, Nebraska,
Michigan, Iowa

H1: Belief in climate change will have increased.

H2: Belief in climate change will have increased.

H1: Belief in climate change will have **increased**.

H2: Risk perceptions associated with climate change **will have increased**.

H3: Attitudes toward climate change adaptation **will have become more favorable**.

- Climate change is occurring, and it is **caused mostly by natural changes** in the environment

- Climate change is occurring, and it is **caused mostly by natural changes** in the environment
- Climate change is occurring, and it is **caused mostly by human activities**

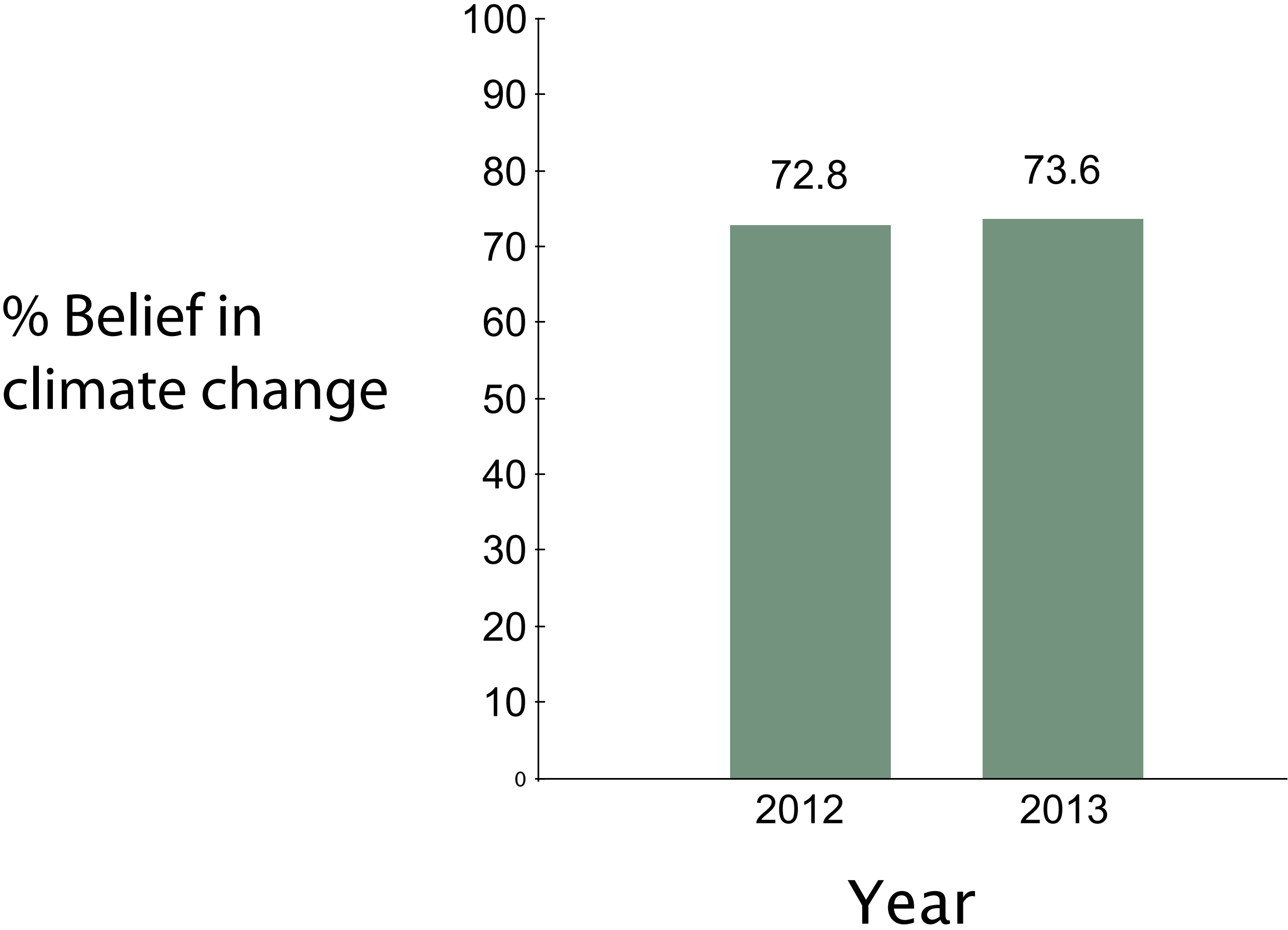
- Climate change is occurring, and it is **caused mostly by natural changes** in the environment
- Climate change is occurring, and it is **caused mostly by human activities**
- Climate change is occurring, and it is **caused equally by natural** changes in the environment and human activities

- Climate change is occurring, and it is **caused mostly by natural changes** in the environment
- Climate change is occurring, and it is **caused mostly by human activities**
- Climate change is occurring, and it is **caused equally by natural** changes in the environment and human activities
- Climate change is **not occurring**

- Climate change is occurring, and it is **caused mostly by natural changes** in the environment
- Climate change is occurring, and it is **caused mostly by human activities**
- Climate change is occurring, and it is **caused equally by natural** changes in the environment and human activities
- Climate change is **not occurring**
- **There is not sufficient evidence** to know with certainty if climate change is occurring or not

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Results: Climate change belief



Results: Climate change belief

Pre-drought (%)

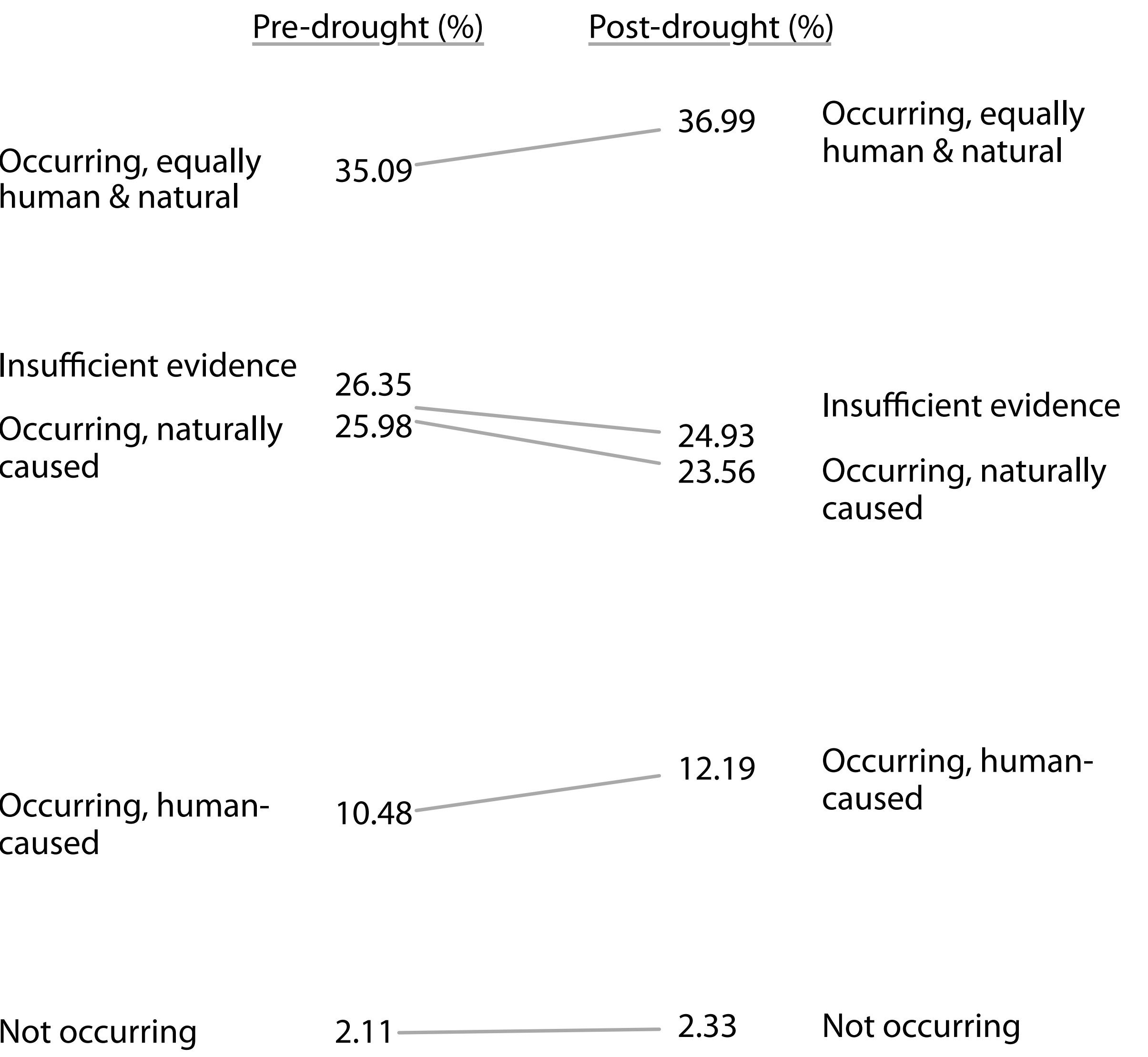
Occurring, equally
human & natural 35.09⁻

Insufficient evidence 26.35⁻
Occurring, naturally
caused 25.98⁻

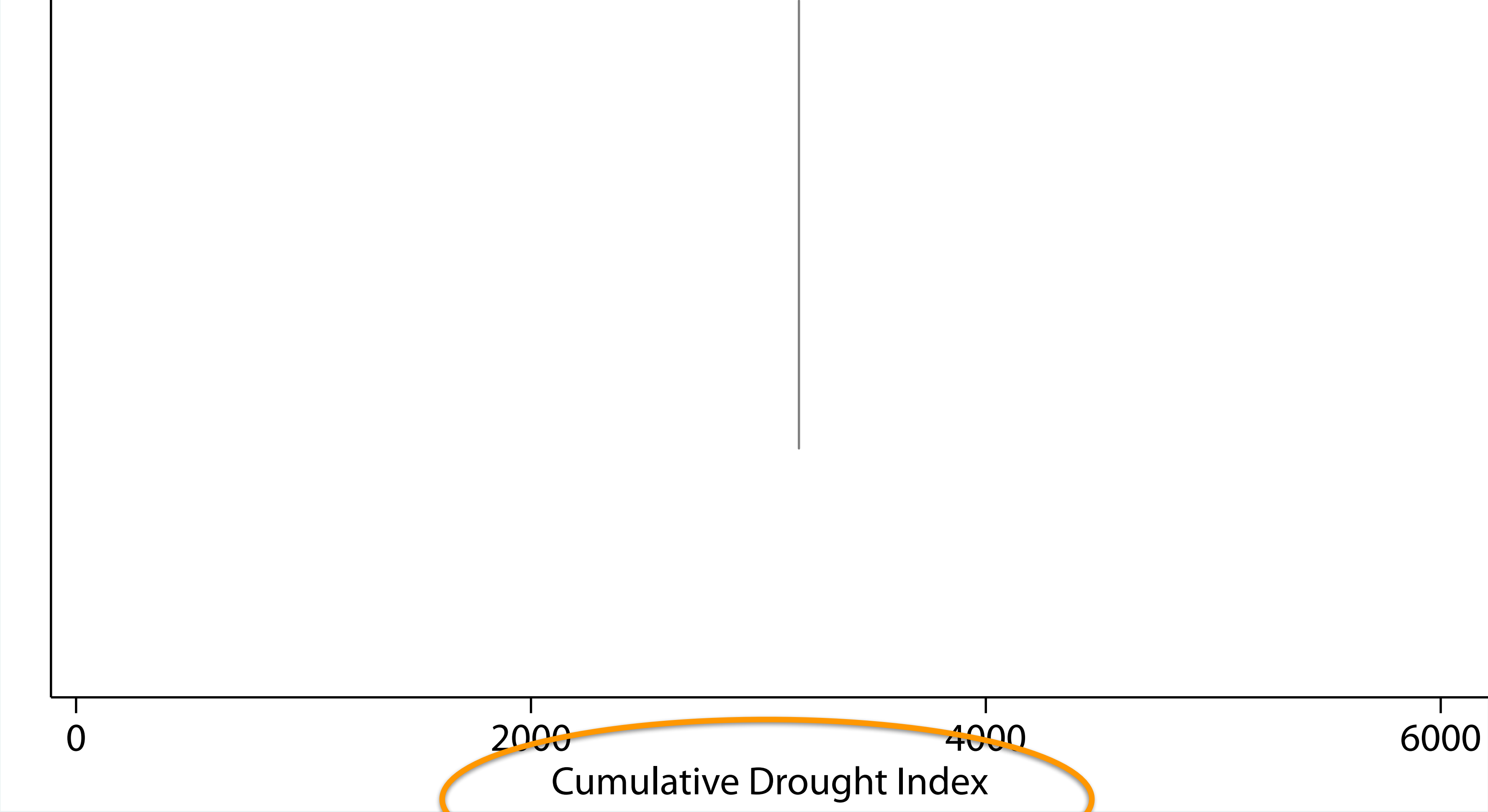
Occurring, human-
caused 10.48⁻

Not occurring 2.11[—]

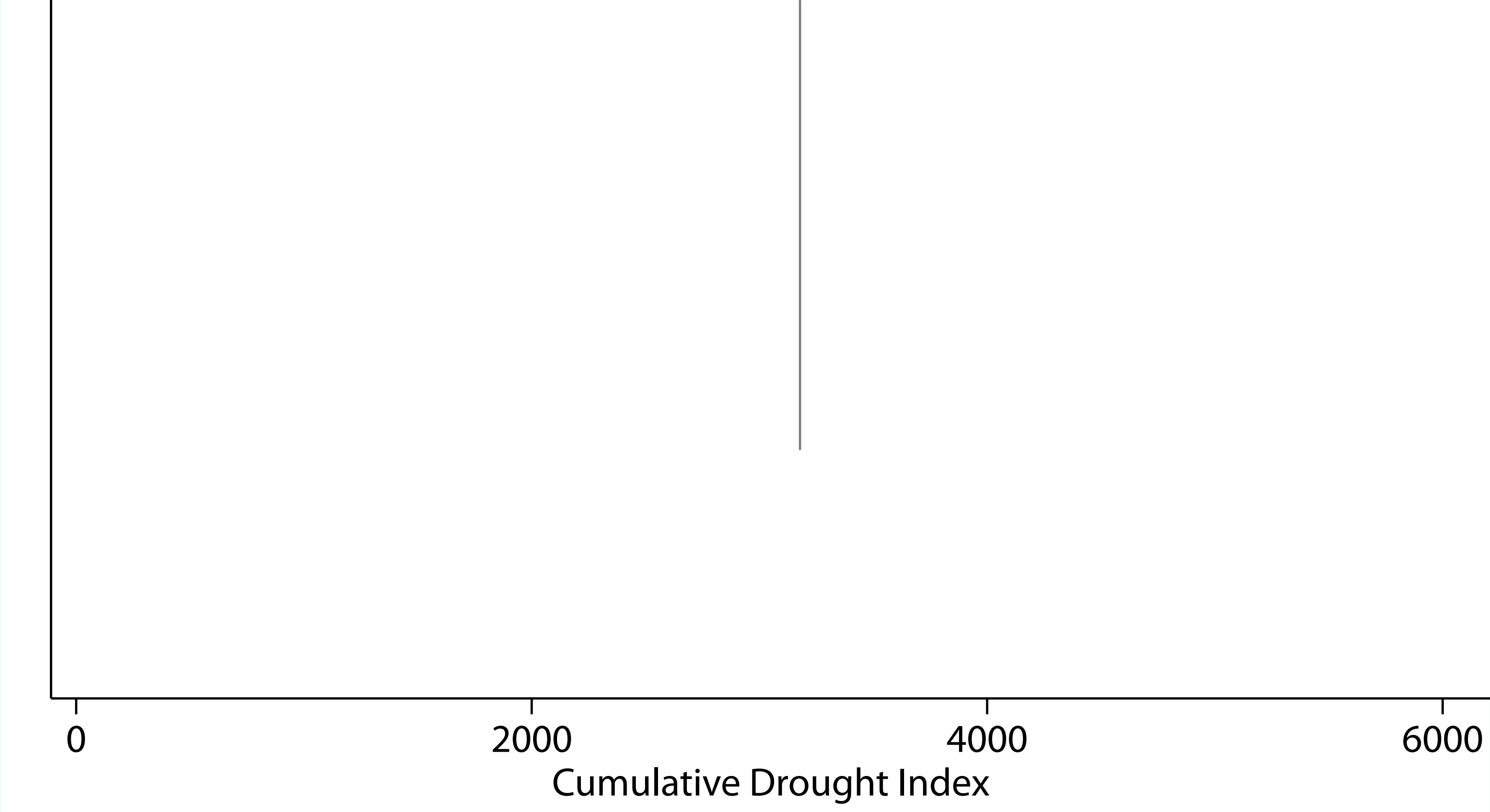
Results: Climate change belief



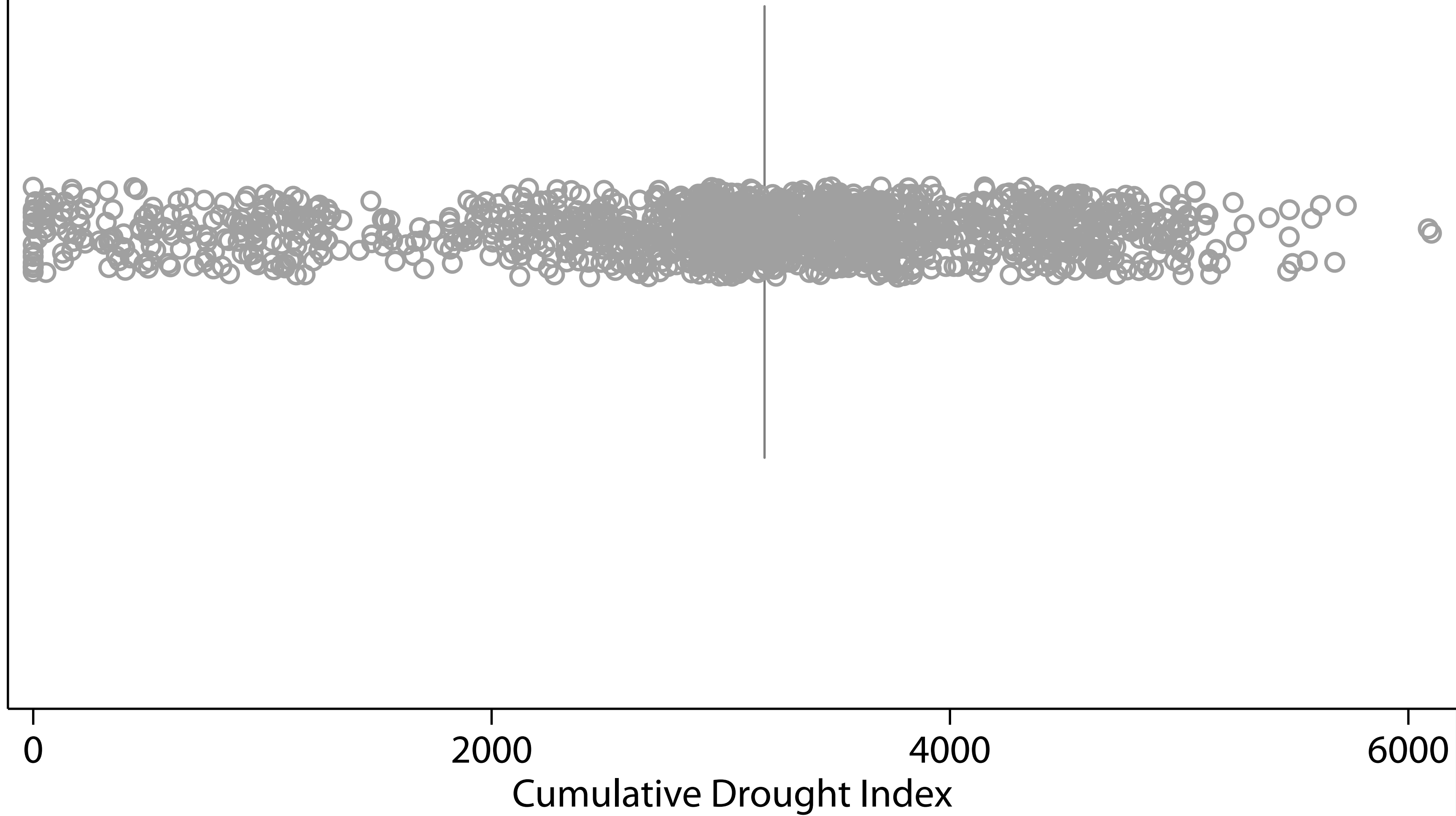
Results: Climate change belief



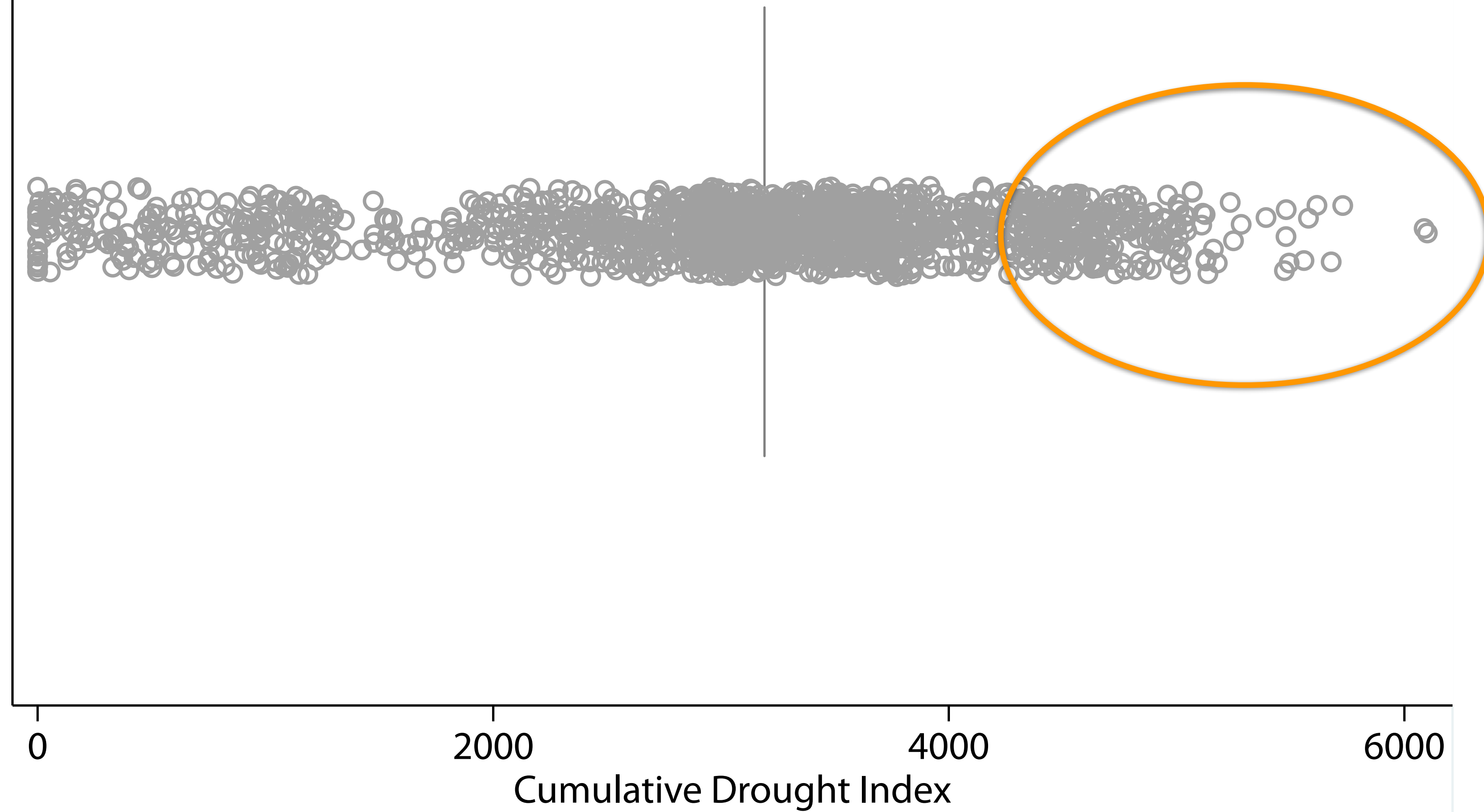
Results: Climate change belief



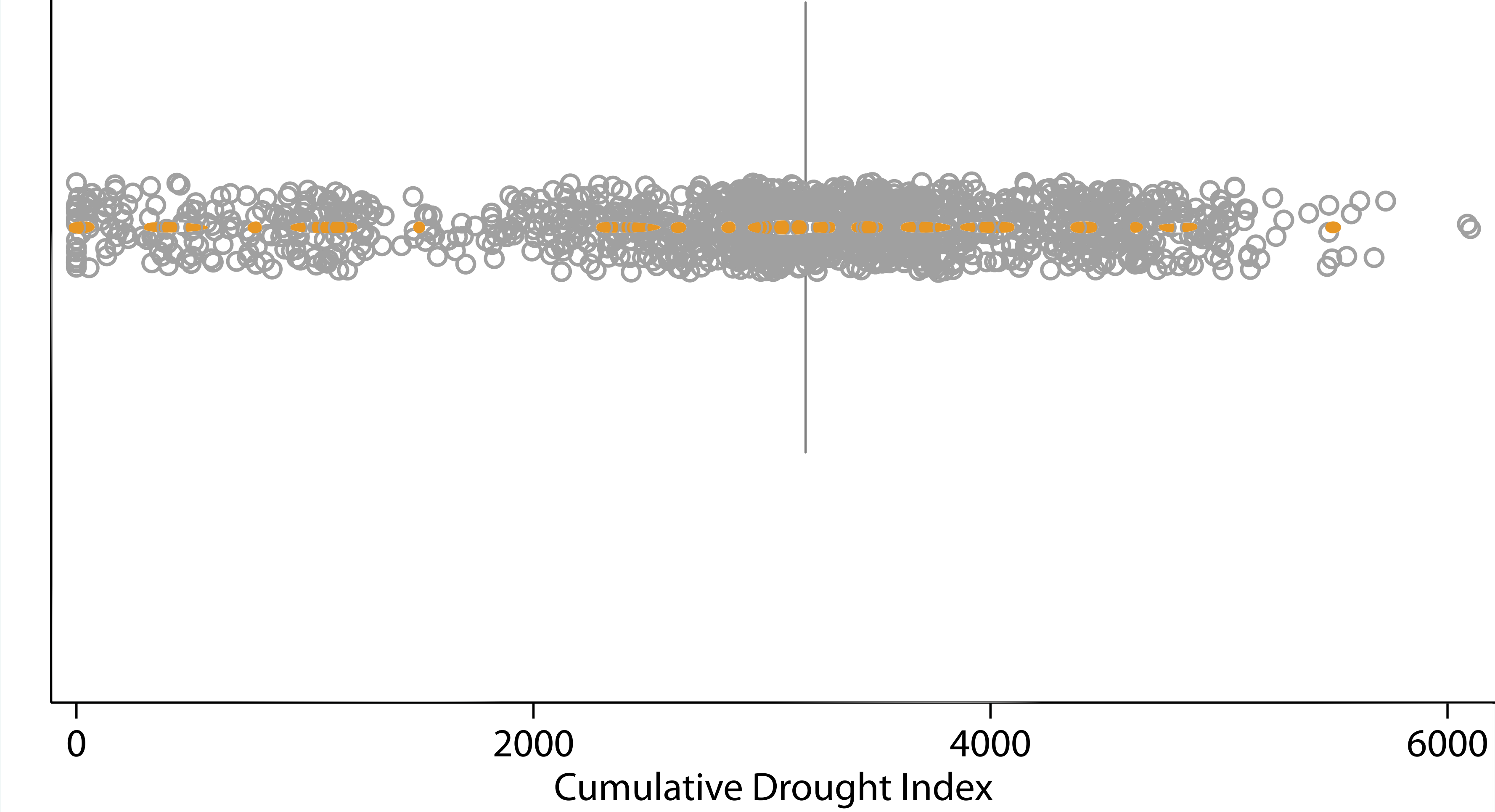
Results: Climate change belief



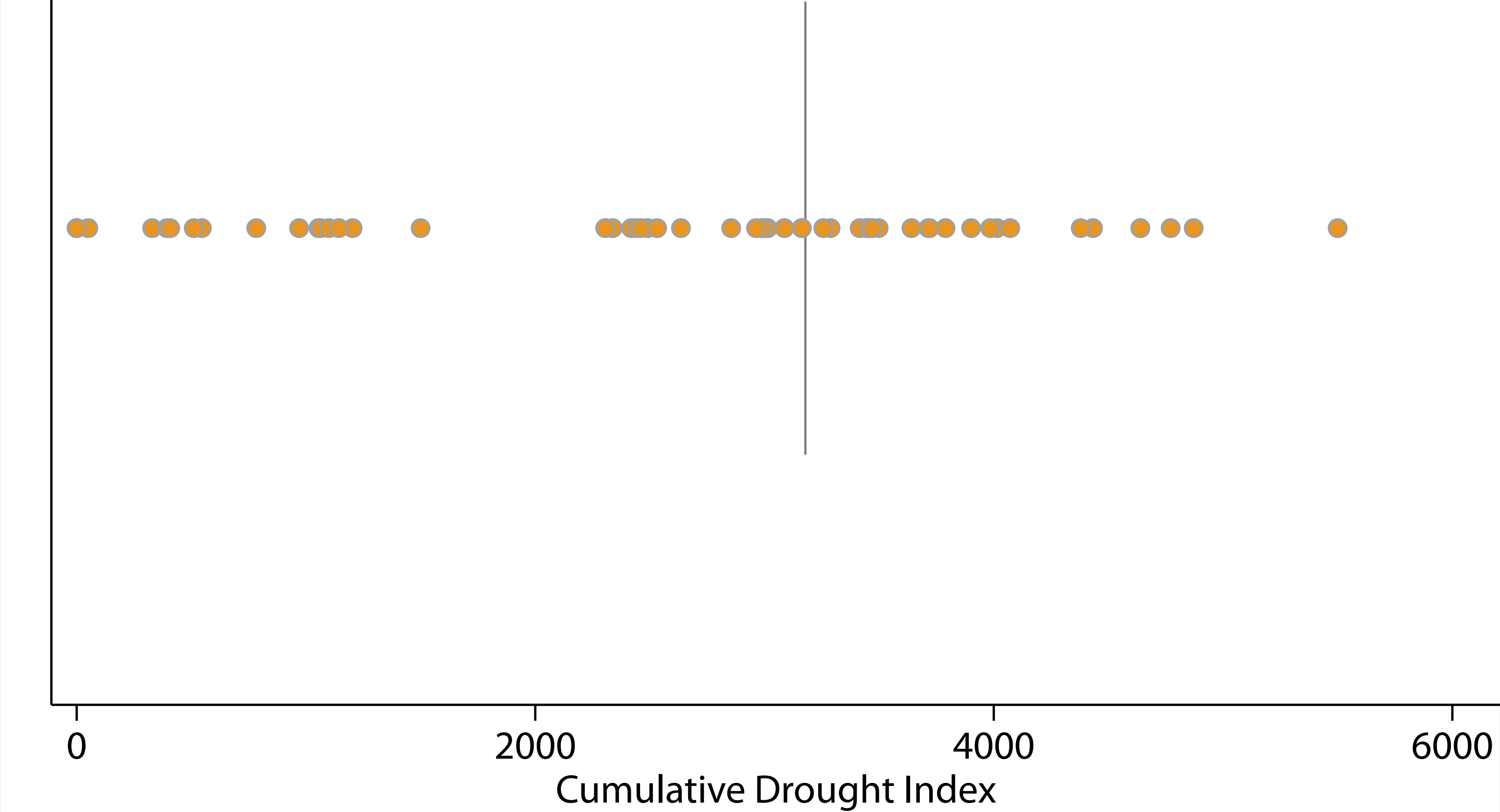
Results: Climate change belief



Results: Climate change belief



Results: Climate change belief



H1: Belief in climate change will have increased.

H1: Belief in climate change **did not increase**.

H2: Risk perceptions associated with climate change **will have increased.**

floods

floods
rain

floods

rain

ponding

floods

rain

ponding

nutrient runoff

floods

rain

ponding

nutrient runoff

drought

floods

rain

ponding

nutrient runoff

drought

heat

floods

rain

ponding

nutrient runoff

drought

heat

weeds

floods

rain

ponding

nutrient runoff

drought

heat

weeds

insects

floods

rain

ponding

nutrient runoff

drought

heat

weeds

insects

disease

Wet Risks

floods
rain
ponding
nutrient runoff

drought
heat

weeds
insects
disease

Wet Risks

floods
rain
ponding
nutrient runoff

Dry Risks

drought
heat

weeds
insects
disease

Wet Risks

floods
rain
ponding
nutrient runoff

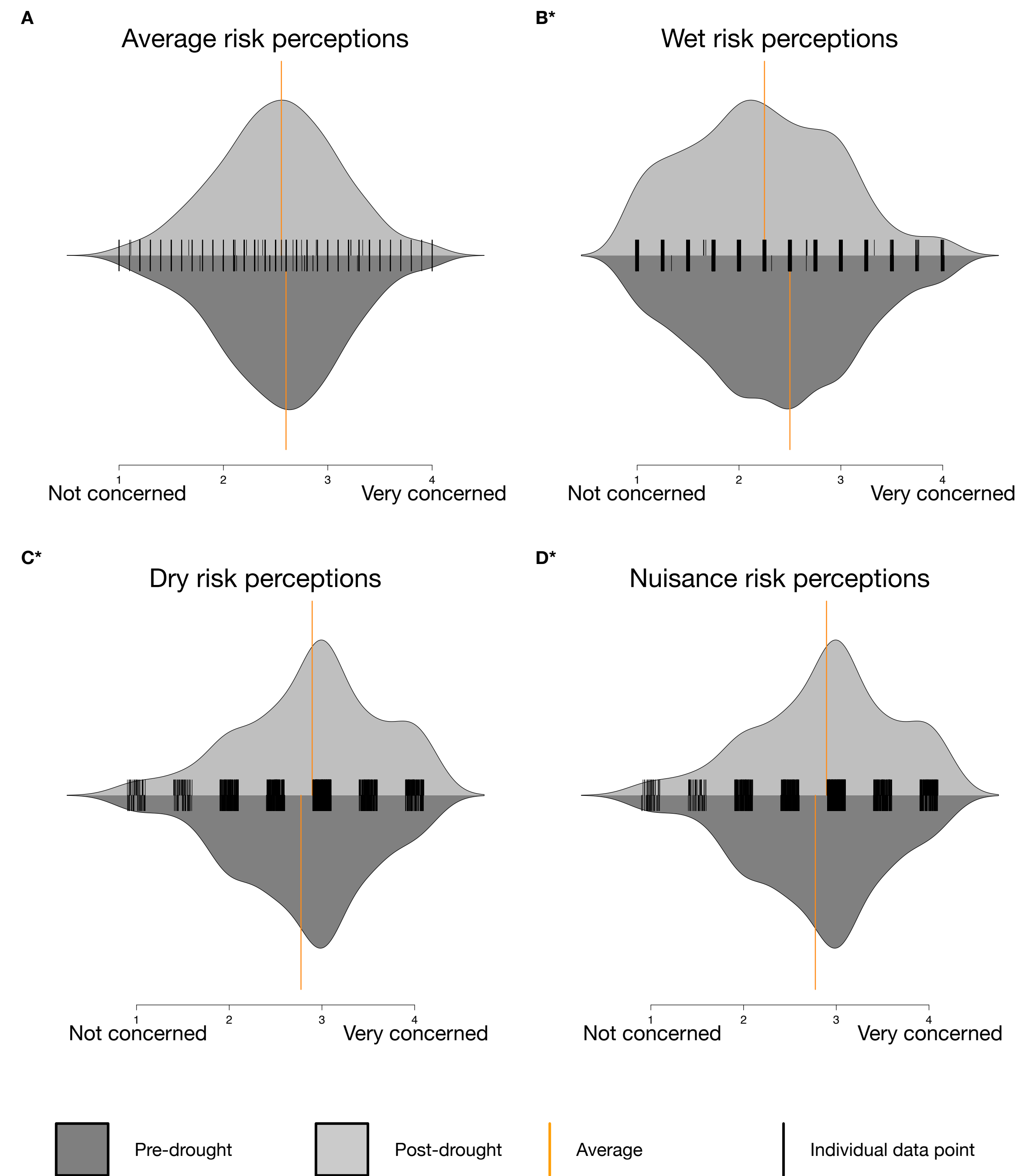
Dry Risks

drought
heat

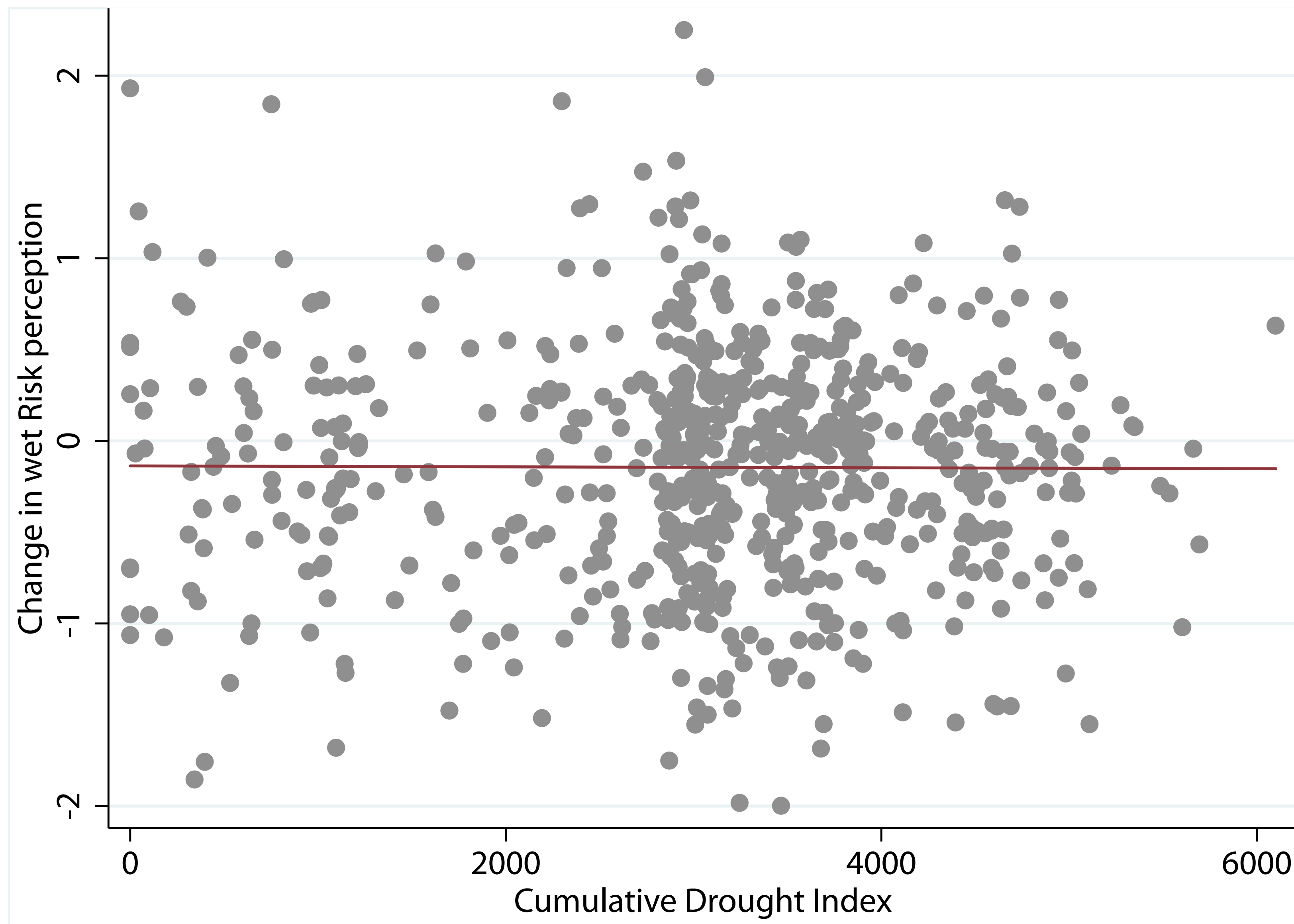
Nuisance Risks

weeds
insects
disease

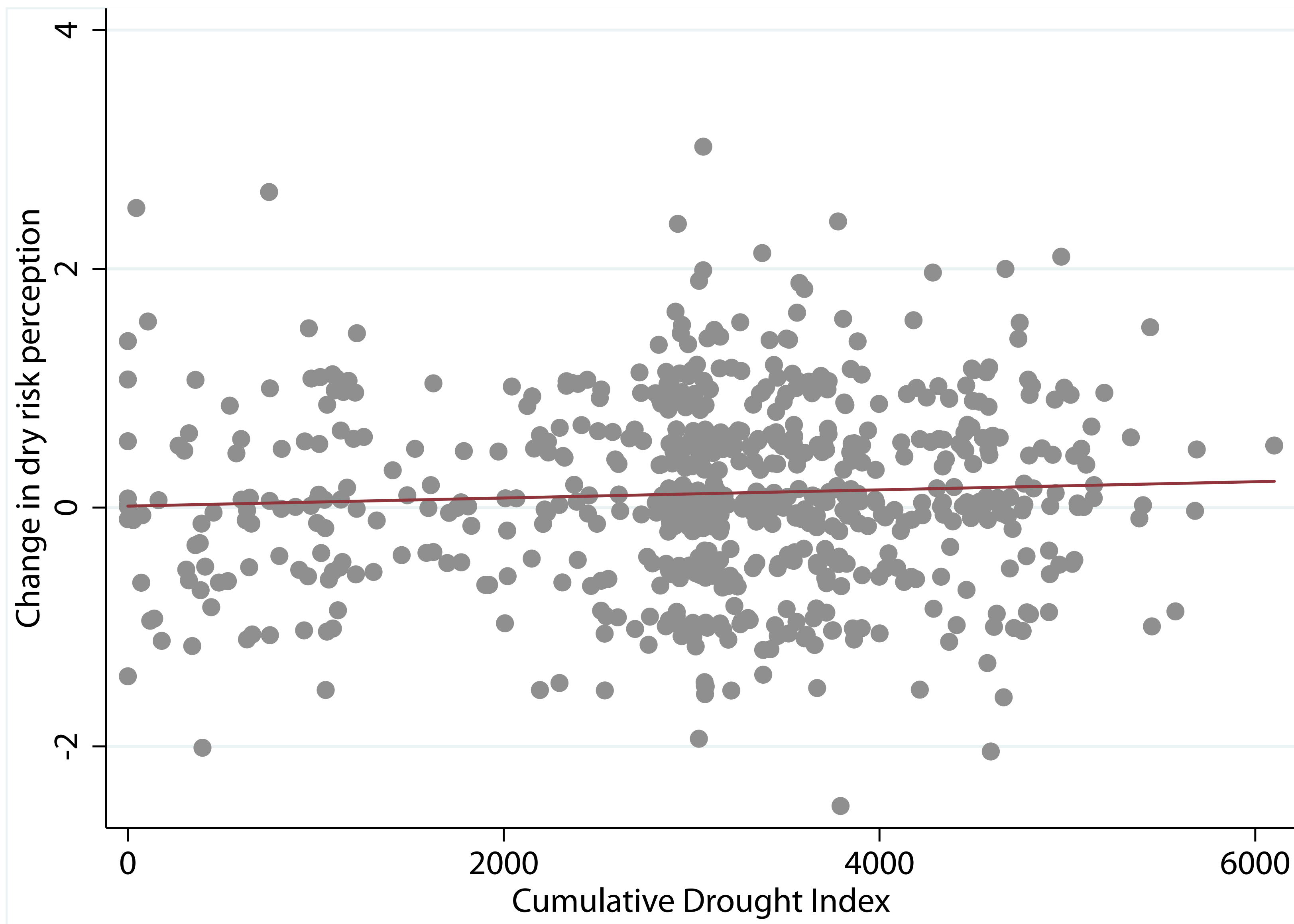
Results: Risk perceptions



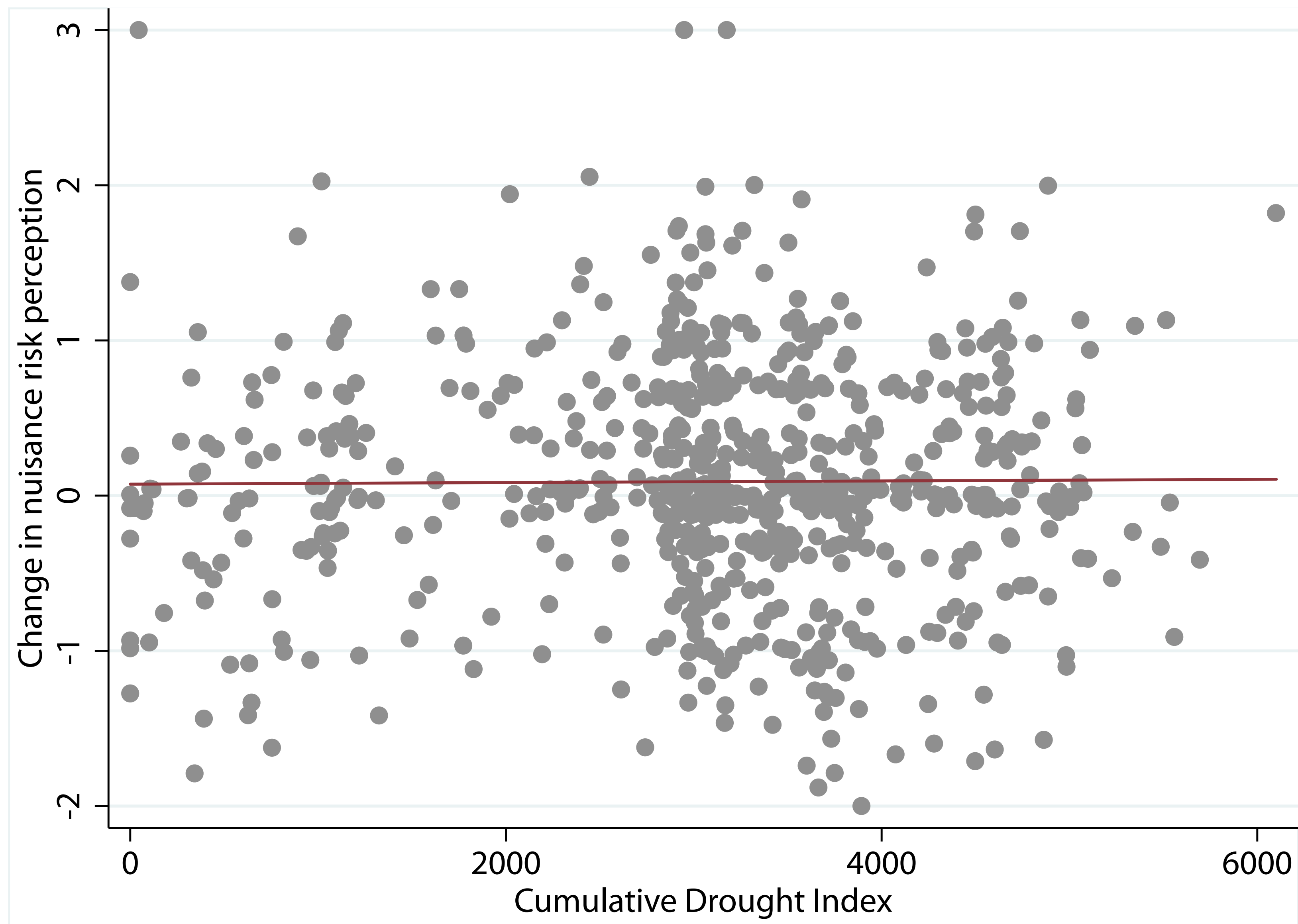
Results: Risk perceptions



Results: Risk perceptions



Results: Risk perceptions

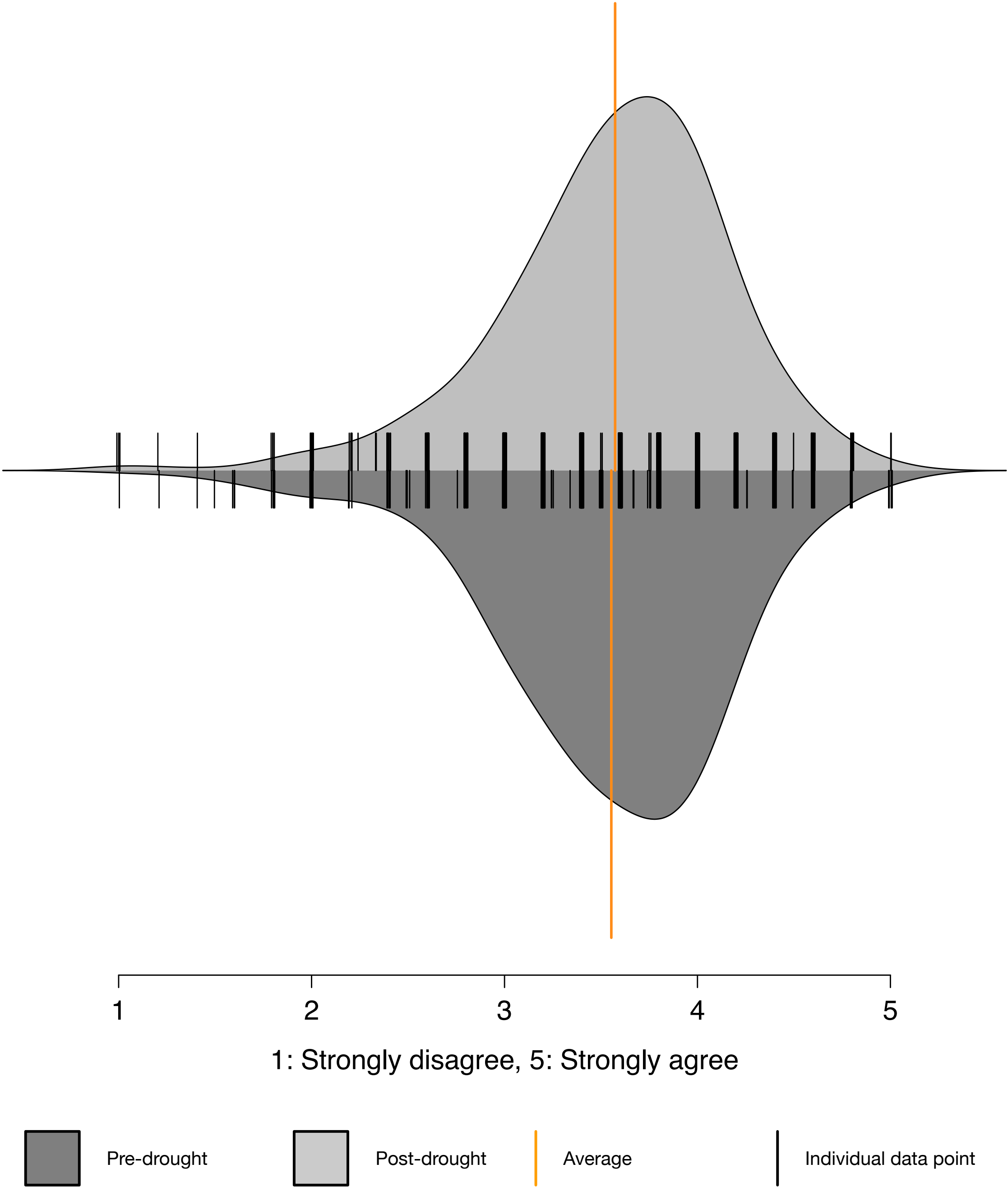


H2: Risk perceptions associated with climate change **will have increased.**

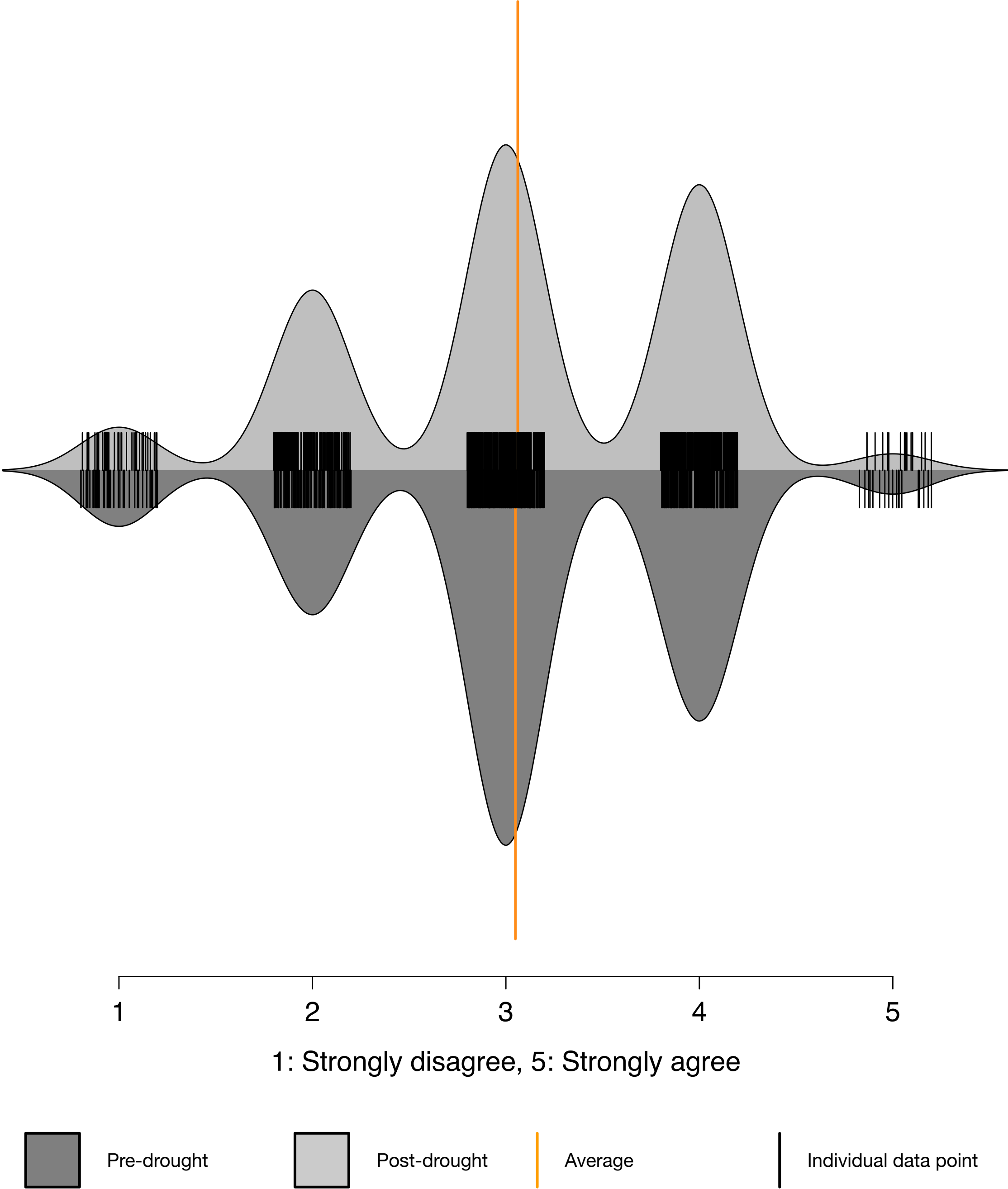
H2: Risk perceptions associated with climate change **shifted**.

H3: Attitudes toward climate change adaptation
will have become more favorable.

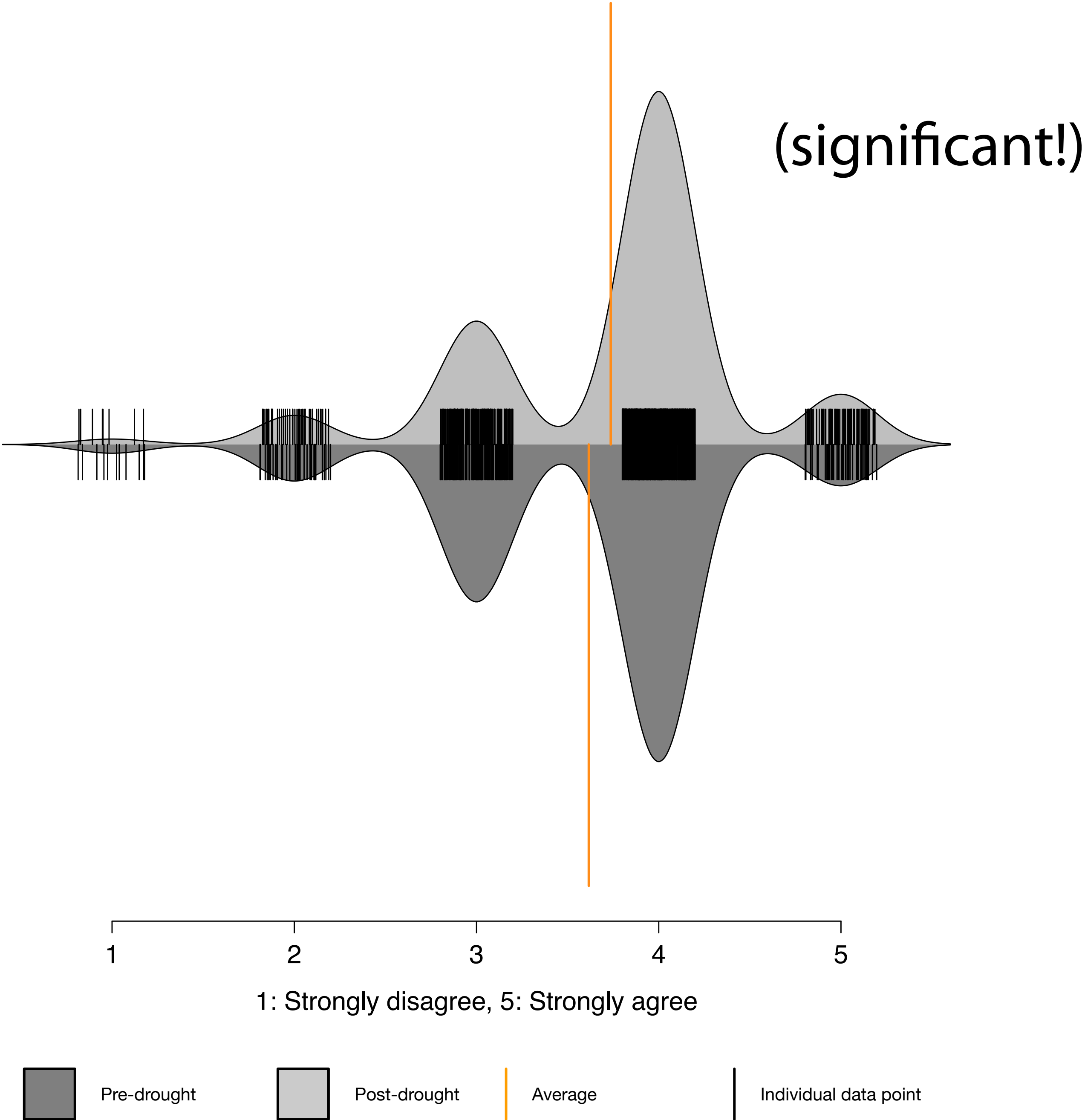
Results: Average
adaptation attitude



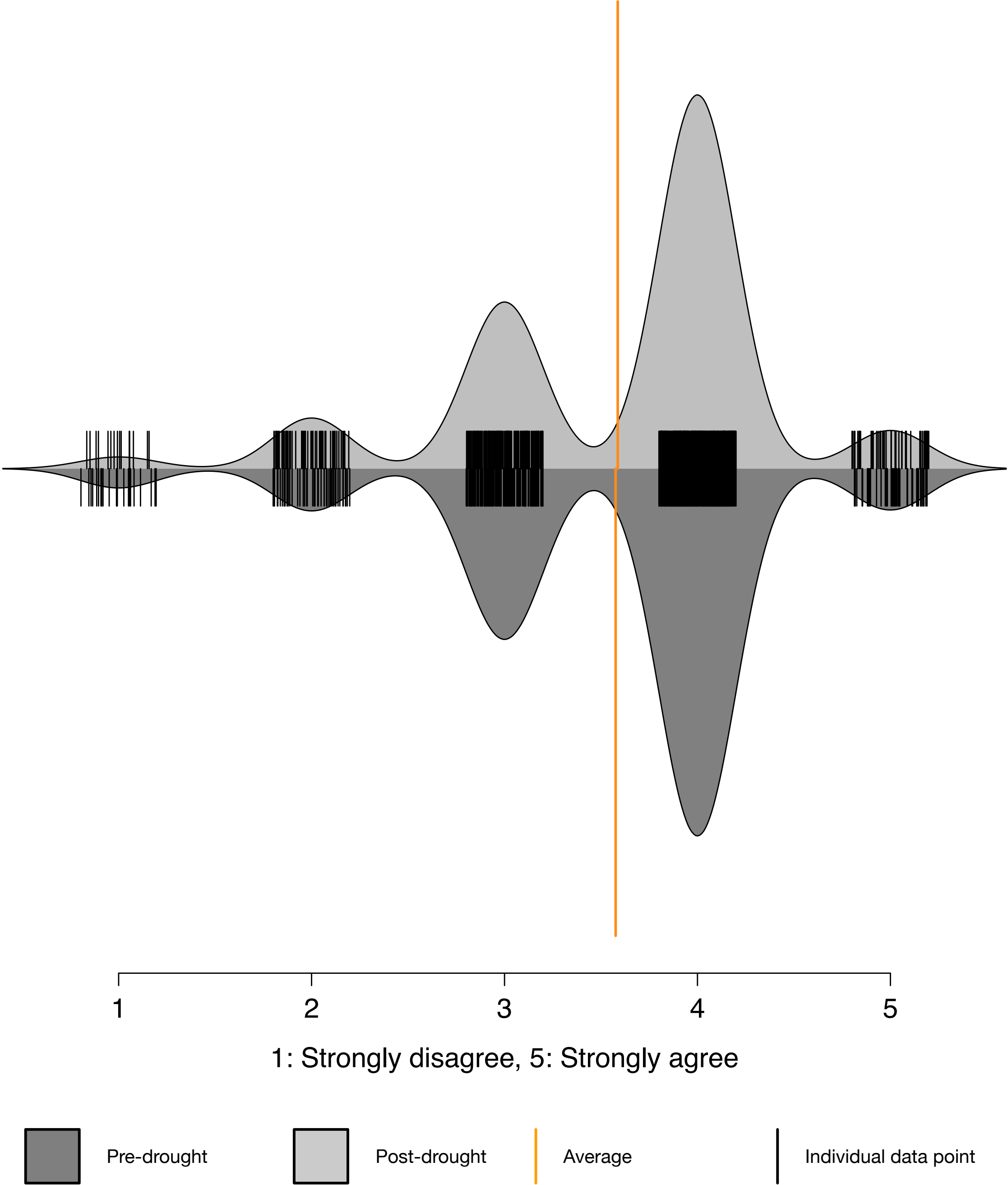
Results: “I would like to provide advice based on climate forecasts.”



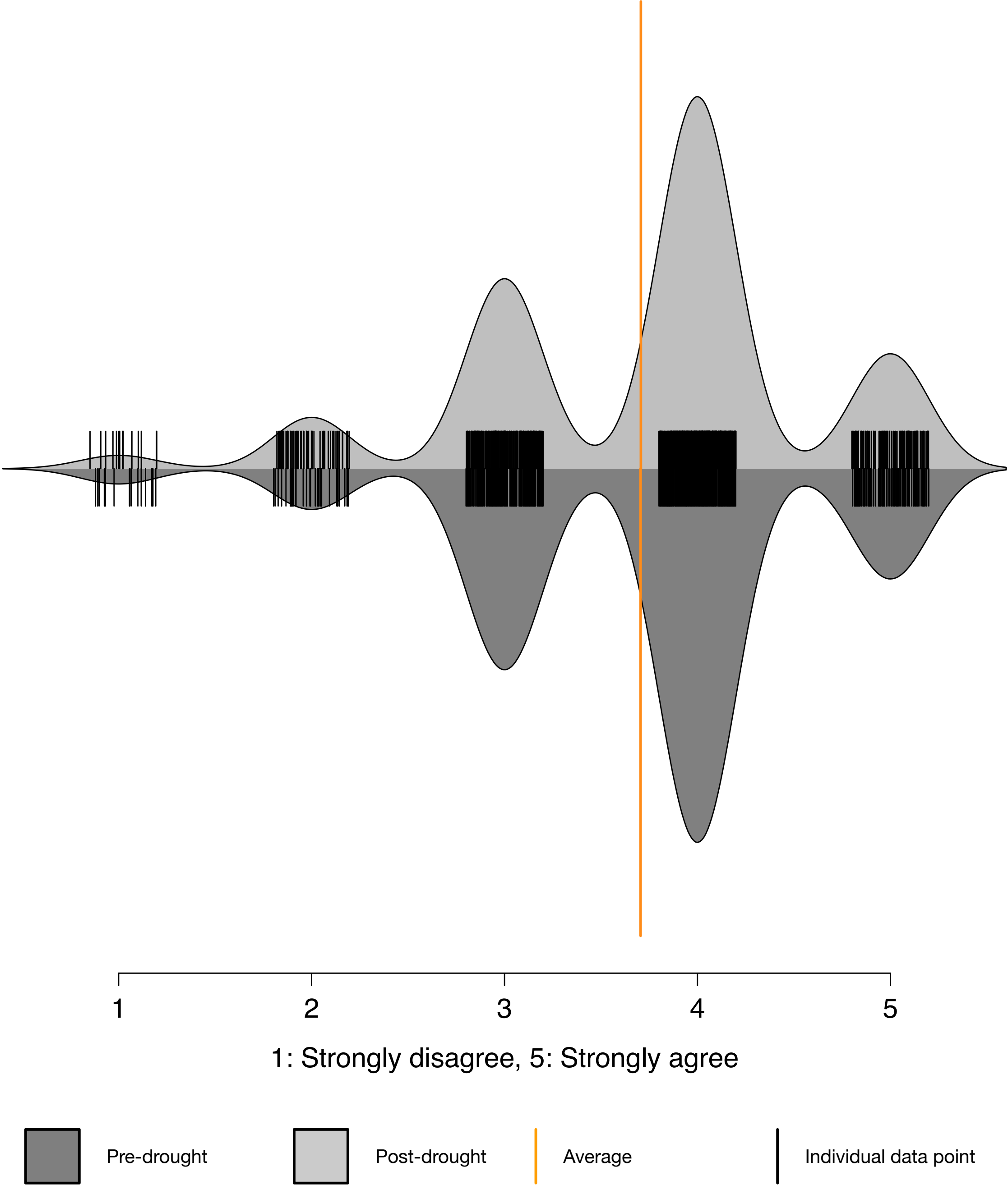
Results: “Farmers should take additional steps to protect farmland from increased weather variability.”



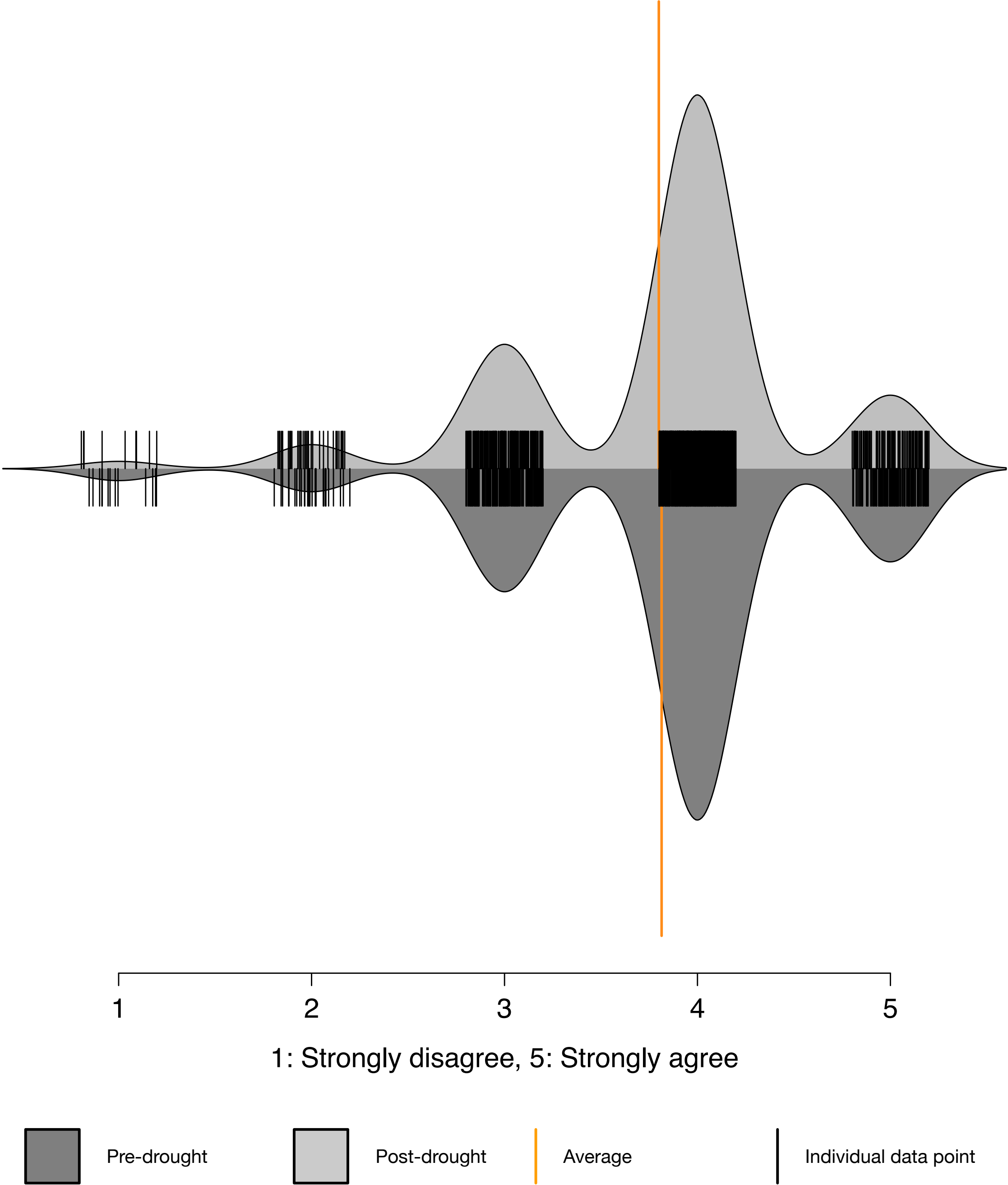
Results: “In my role as advisor, I should help farmers prepare for increased weather variability.”



Results: “Changing practices to cope with increasing climate variability is important to the long-term success of the farmers I advise.”



Results: “It is important for farmers to adapt to climate change to ensure the long-term success of U.S. agriculture.”



H3: Attitudes toward climate change adaptation
will have become more favorable.

H3: Attitudes toward climate change adaptation
did not change.

Questions so far?



H1: Belief in climate change will have **did not change**.

H2: Risk perceptions associated with climate change **shifted**.

H3: Attitudes toward climate change adaptation **did not change**.

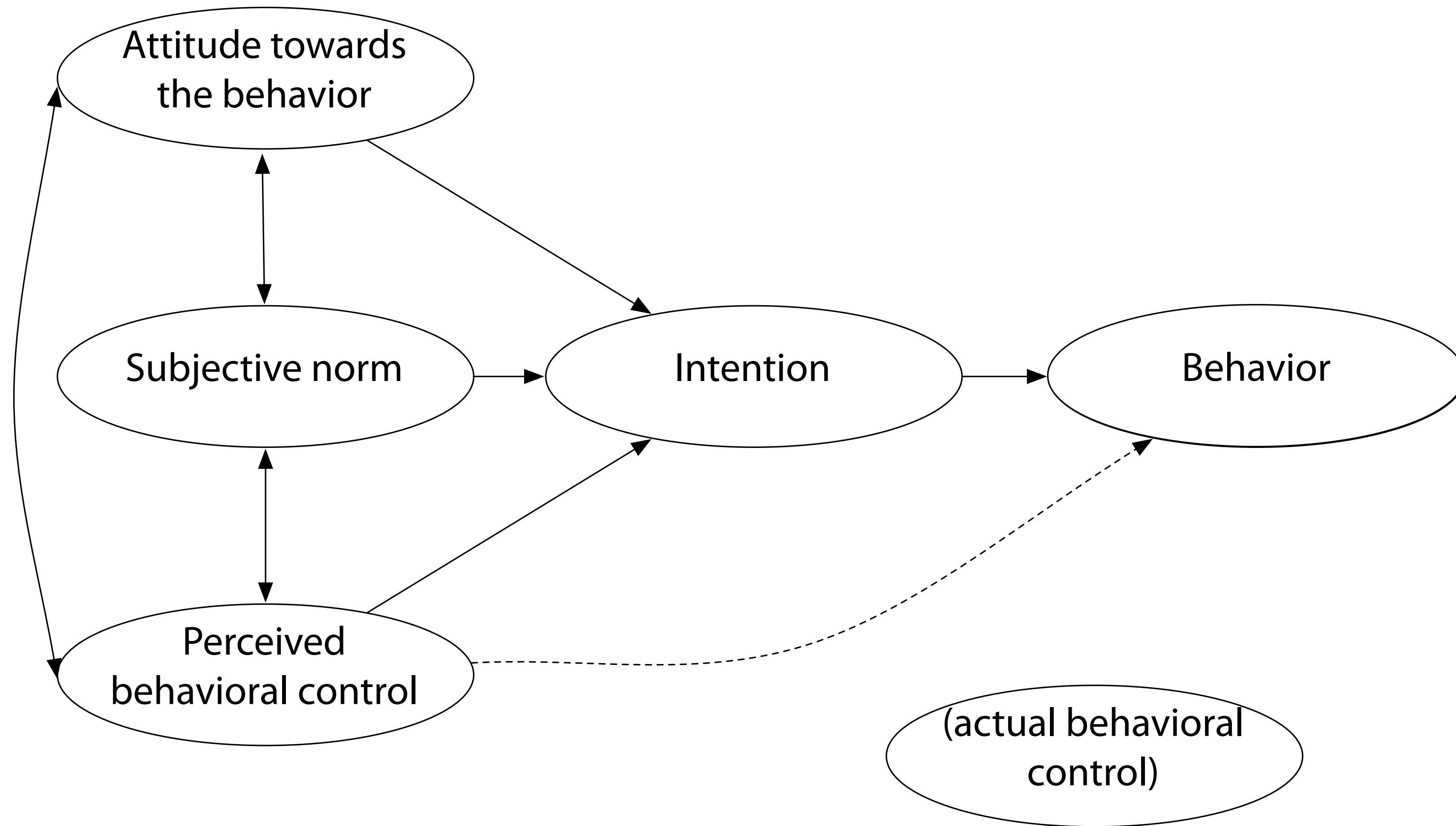
H3: Attitudes toward climate change adaptation
did not change.

H3: Attitudes toward climate change adaptation
did not change.

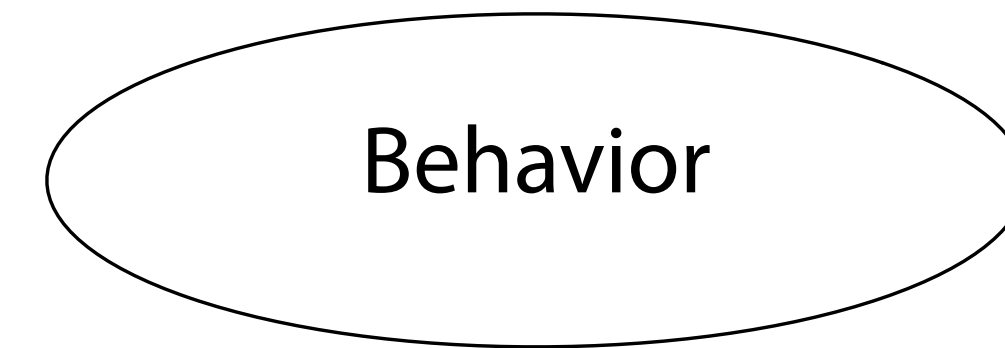




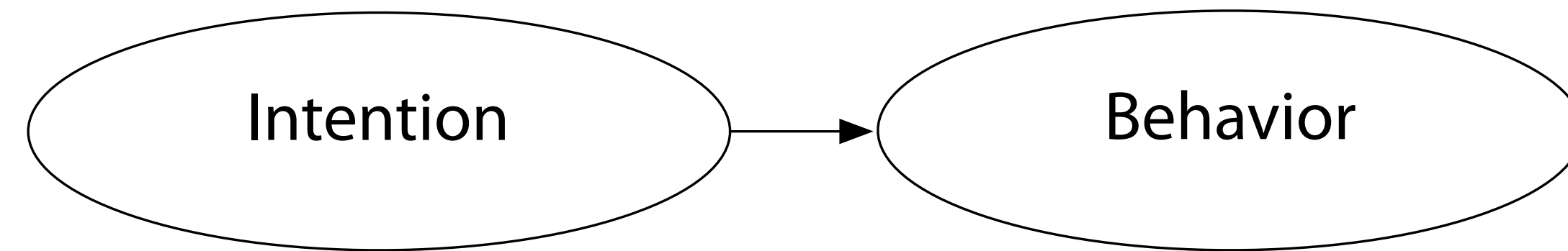
Icek Ajzen & Martin: The Reasoned Action Model



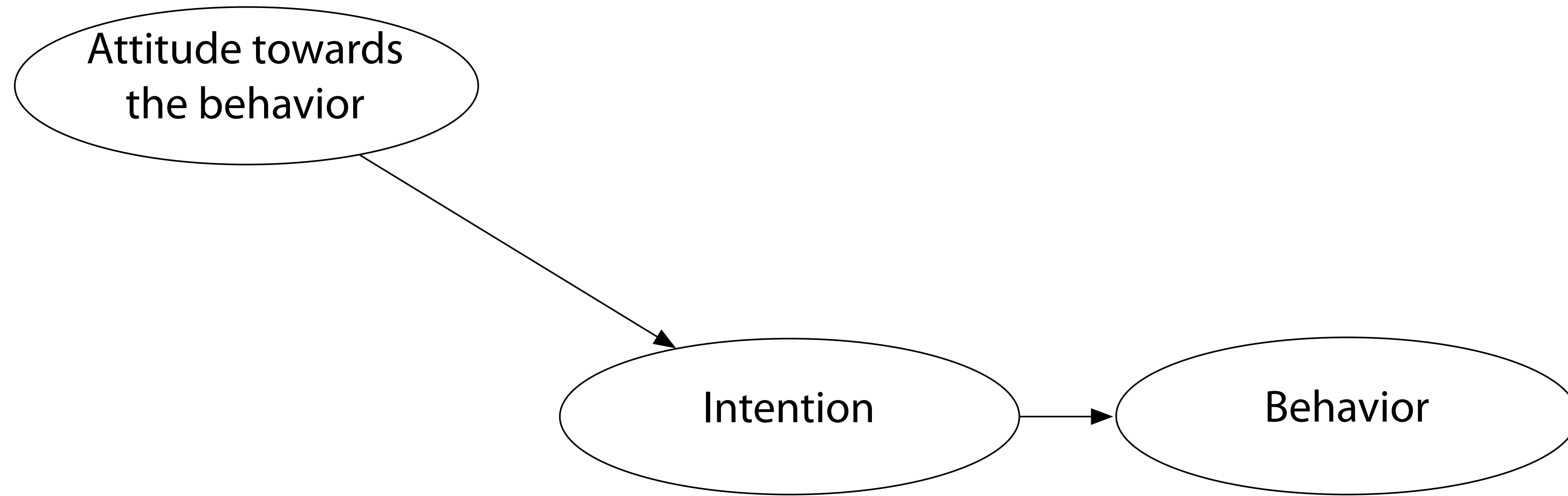
The Reasoned Action Model



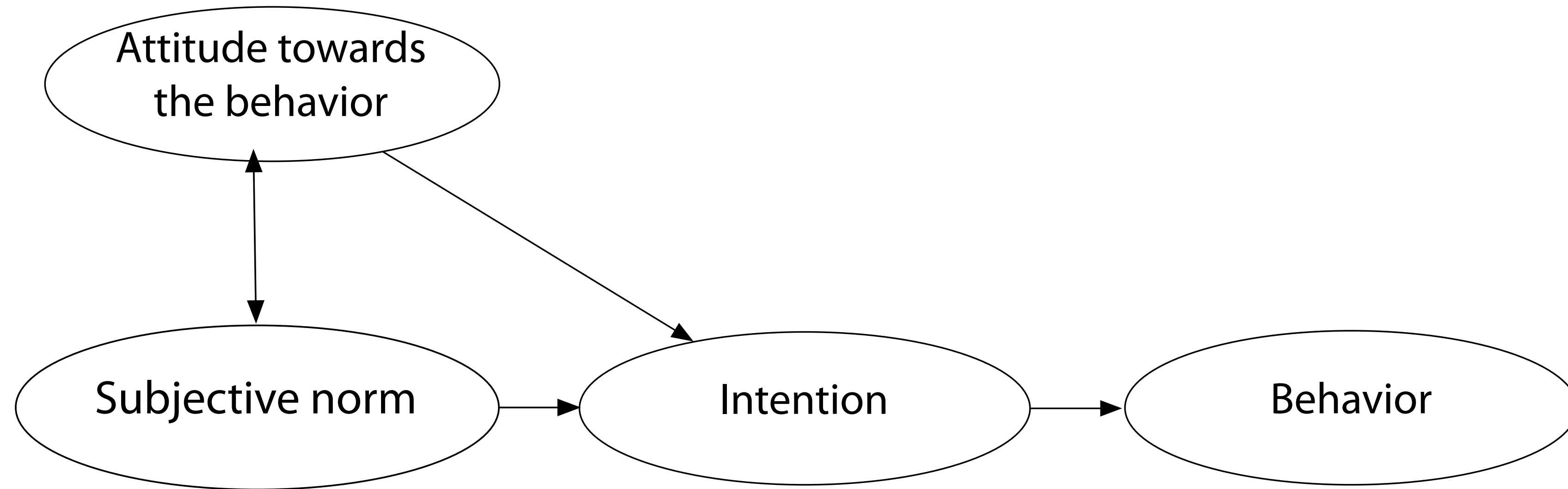
The Reasoned Action Model



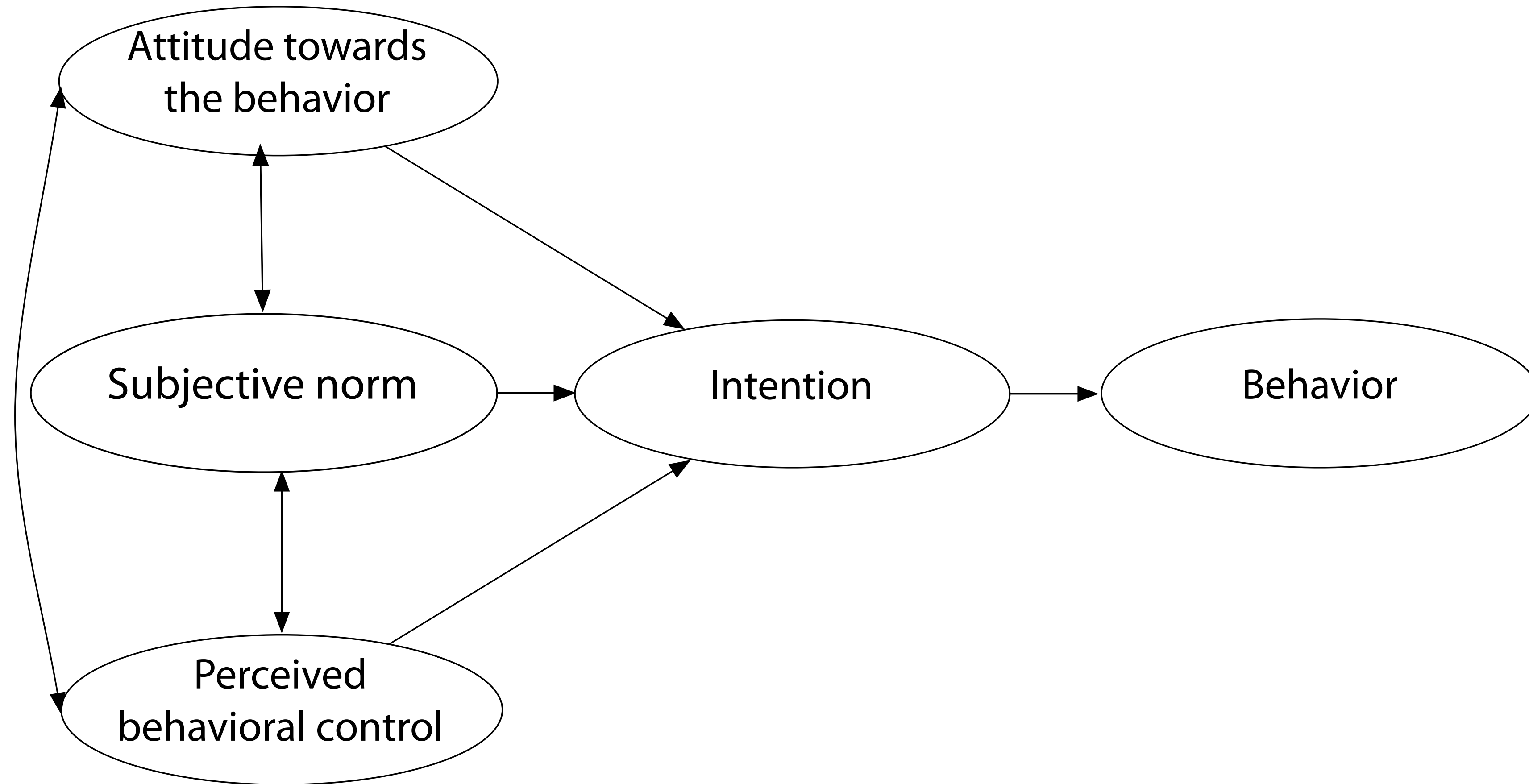
The Reasoned Action Model



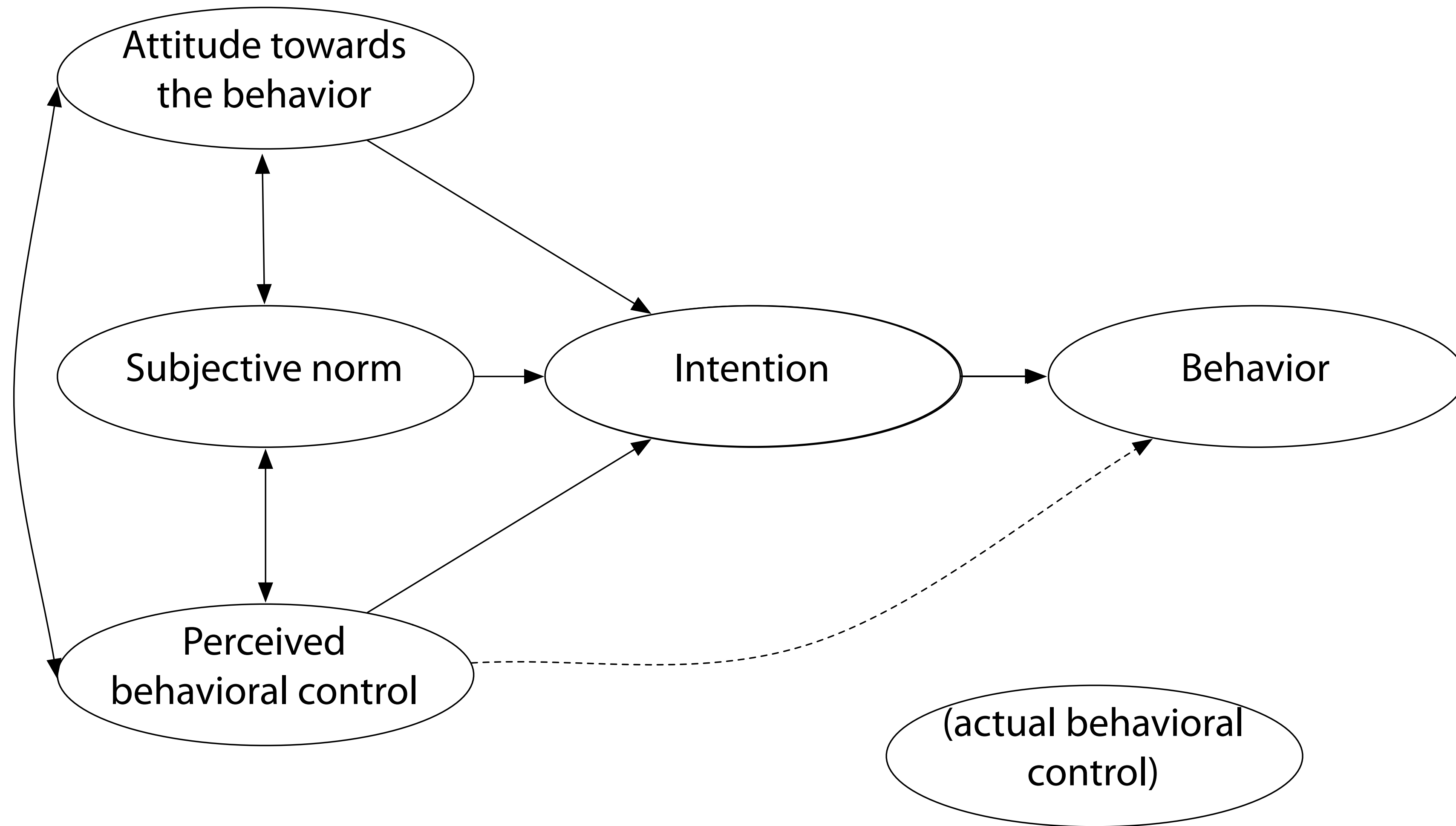
The Reasoned Action Model



The Reasoned Action Model

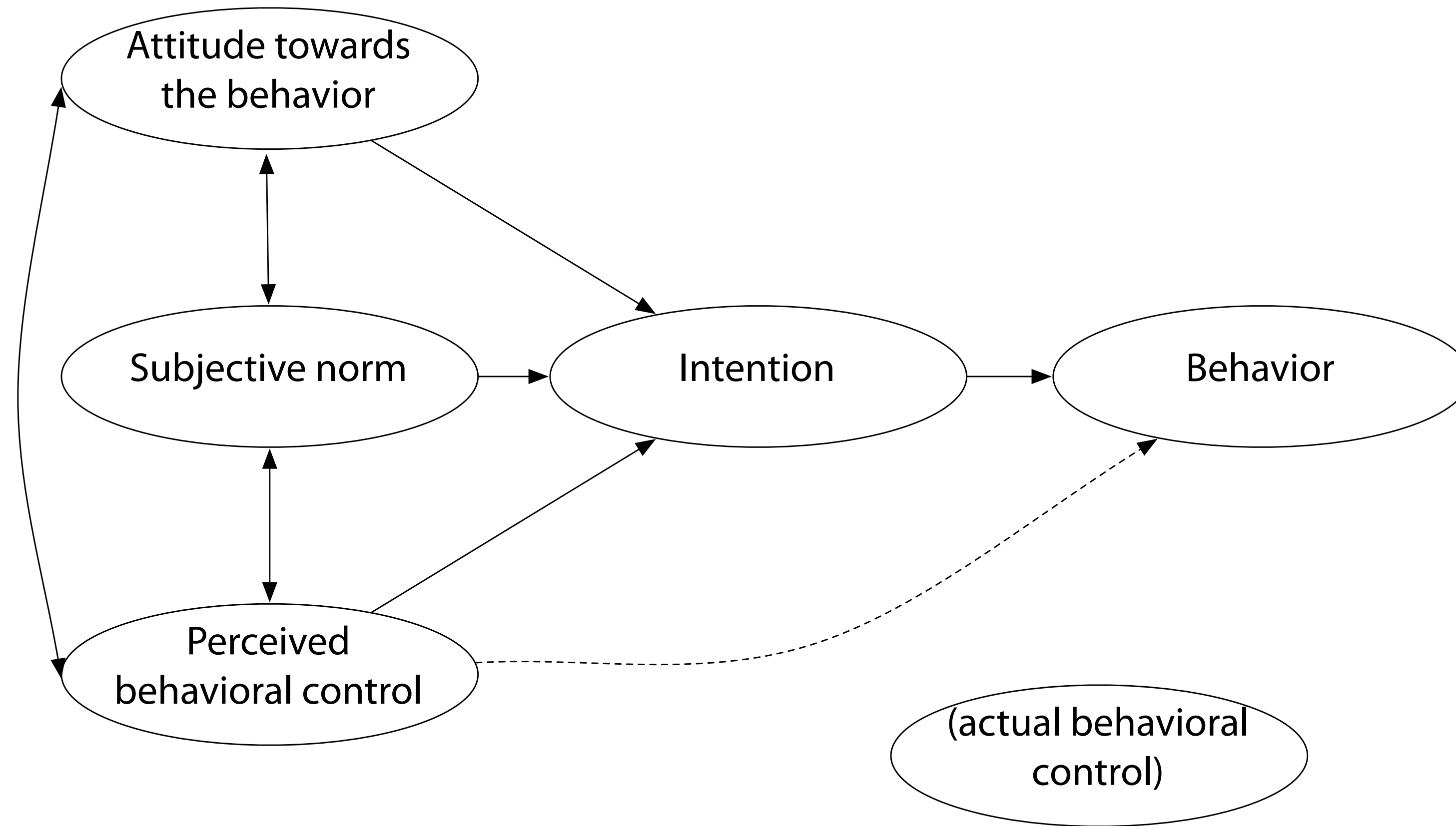


The Reasoned Action Model



The Reasoned Action Model

H3a: Desire to use climate information will be influenced by perceived behavioral control, attitudes, and perceived norms as indicated by the Reasoned Action Approach



Perceived behavioral control: perceived ability to use climate information (2-question construct)

Perceived behavioral control: perceived ability to use climate information (2-question construct)

Attitudes: positive/negative feelings toward using climate information (3-question construct)

Perceived behavioral control: perceived ability to use climate information (2-question construct)

Attitudes: positive/negative feelings toward using climate information (3-question construct)

Perceived norms: influence of peers (2-question construct)

Model

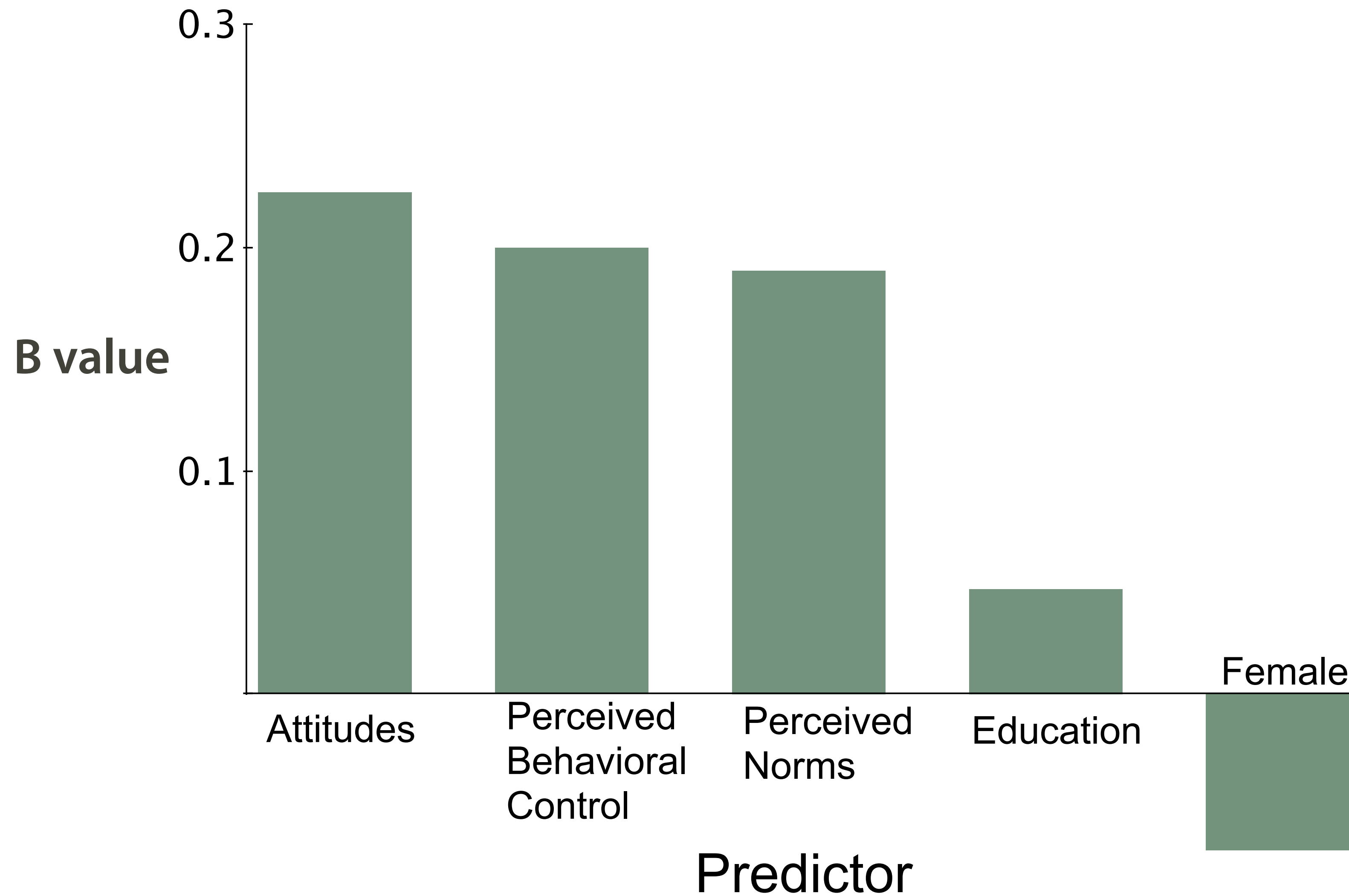
Model

Dependent variable: willingness to use climate information when providing advice to farmers.

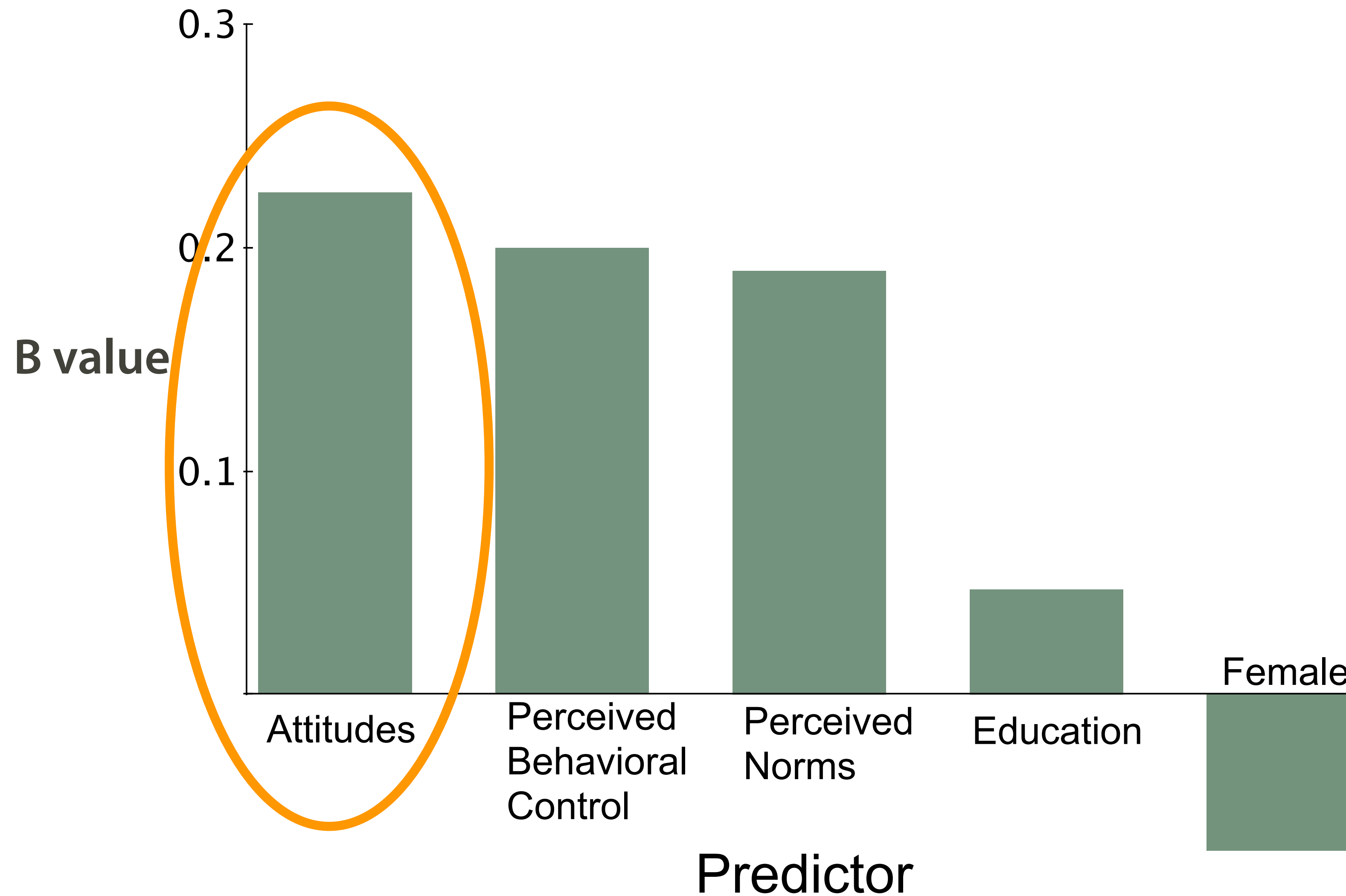
Model

Dependent variable: willingness to use climate information when providing advice to farmers.

Independent variables: attitudes, perceived behavioral control, perceived norms, education, gender



Desire to use climate information significant predictors
($p < 0.001$, $R^2 = 0.20$)



Desire to use climate information significant predictors
($p < 0.001$, $R^2 = 0.20$)

H1: Belief in climate change will have **did not change**.

H2: Risk perceptions associated with climate change **shifted**.

H3: Attitudes toward climate change adaptation **did not change**.

H3a: Attitudes toward climate change adaptation **were predicted by the reasoned action model**.

Critiques & complaints



Critiques & complaints



This is a population of relative elites.

Critiques & complaints



This is a population that is used to dealing with weather cycles.

Critiques & complaints



This is a population that is buffered from the effects of drought by crop insurance.

Critiques & complaints



This drought was only one year.

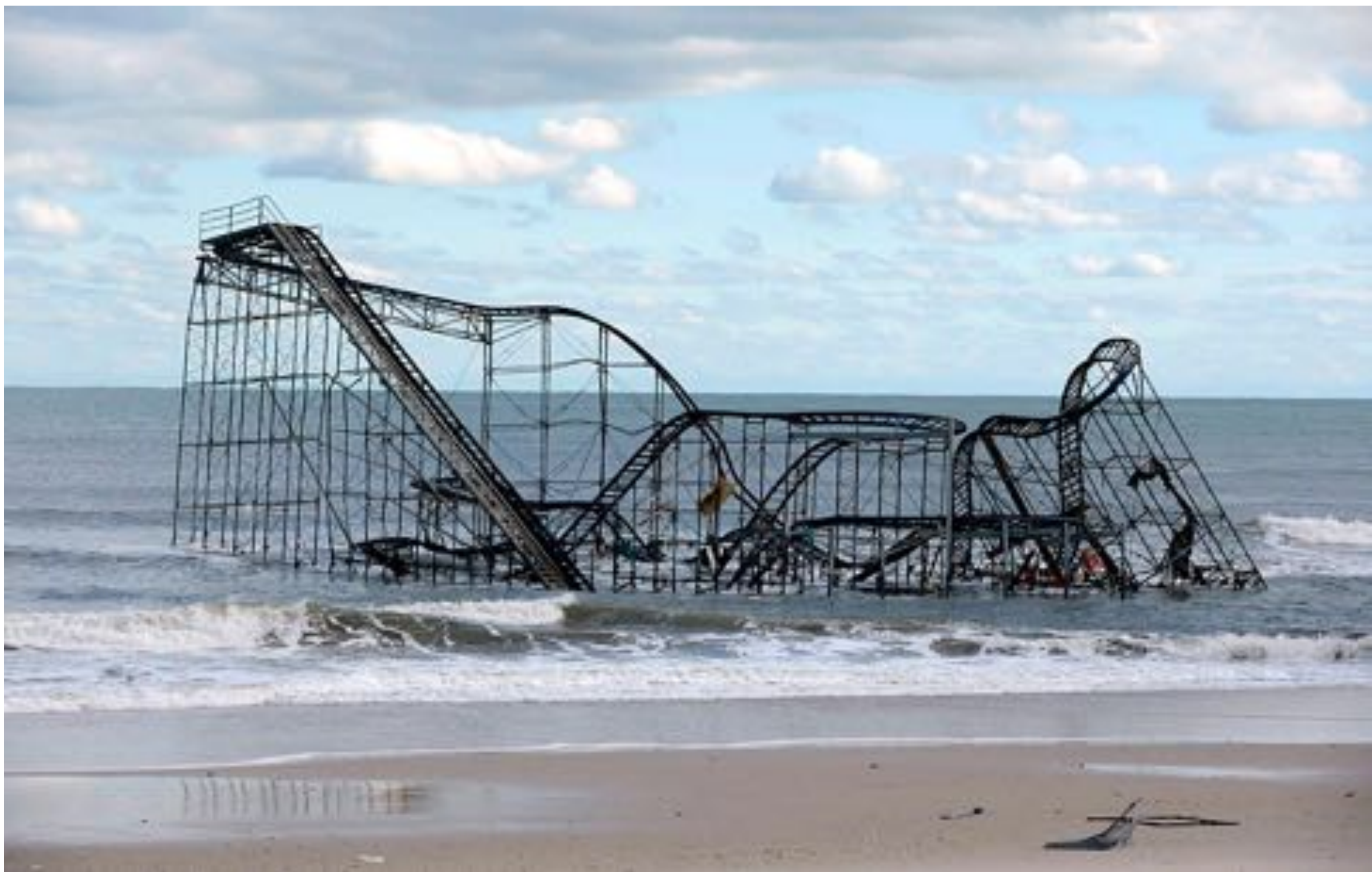


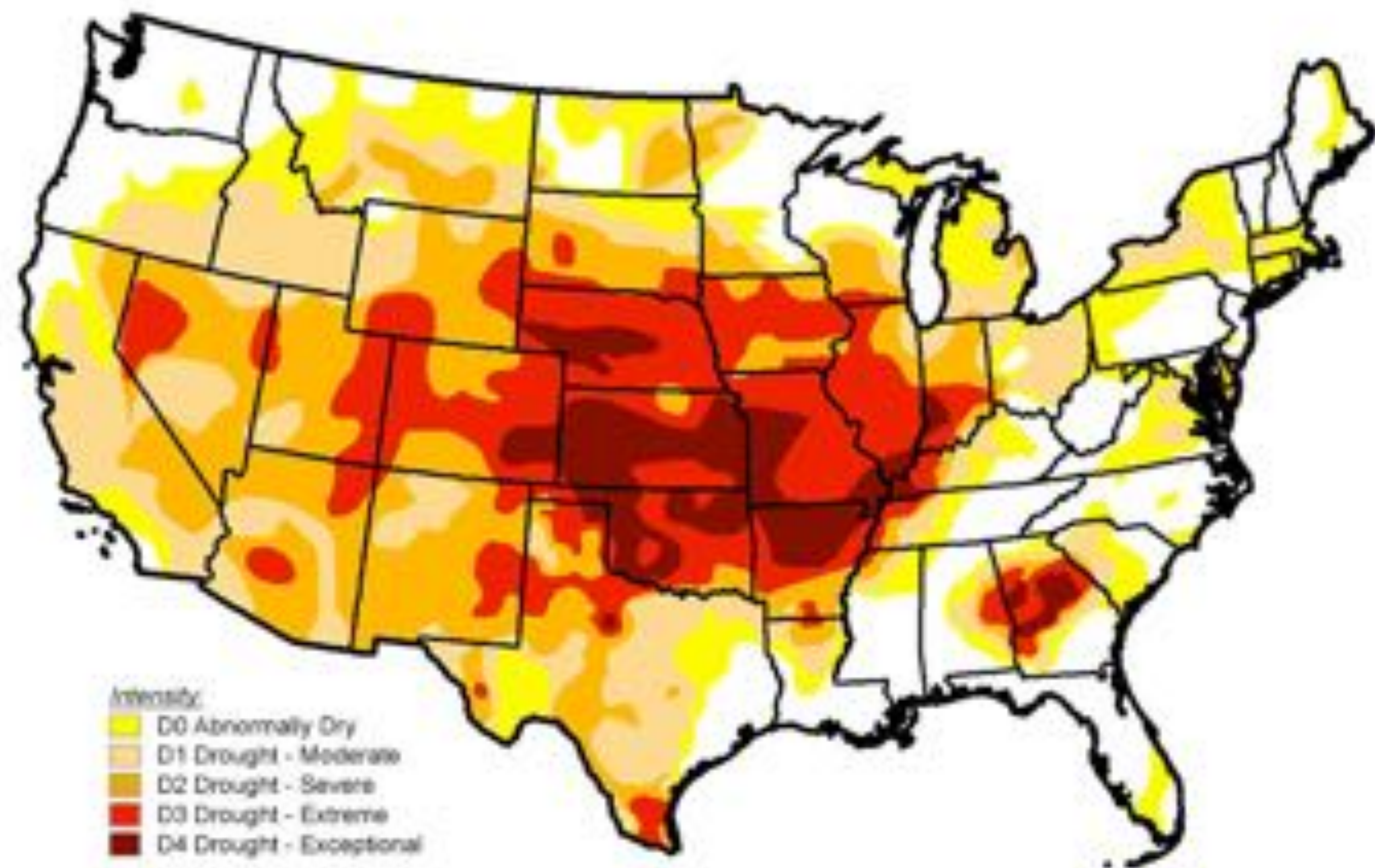
Unprecedented baseline data.

Conclusions

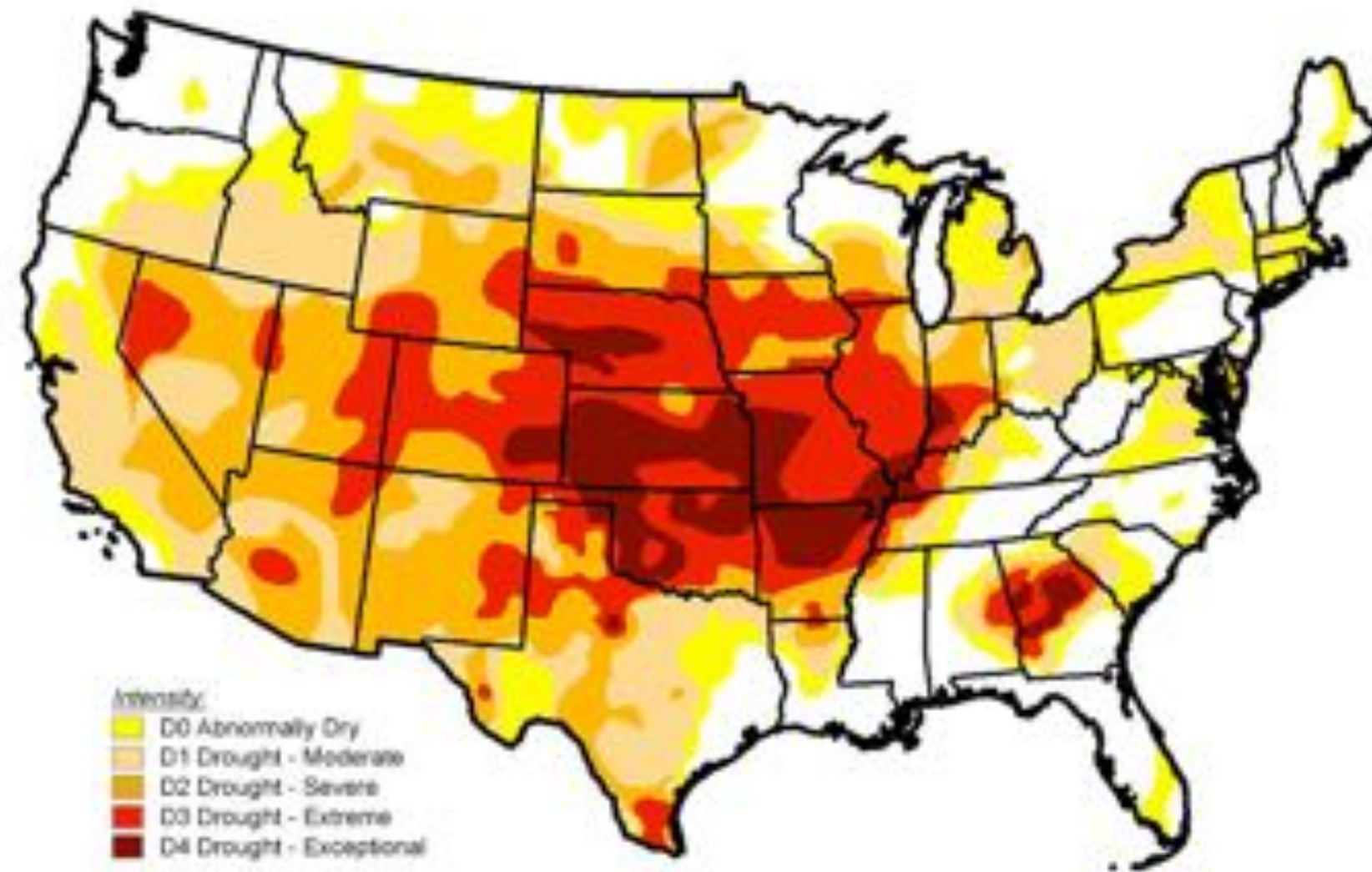
What are the effects of extreme events
on perceptions of climate change?







Conclusions



Extreme events **may not change people's views on climate change.**

Conclusions



Conclusions



Risk Perceptions: an
opportunity for framing?

Conclusions

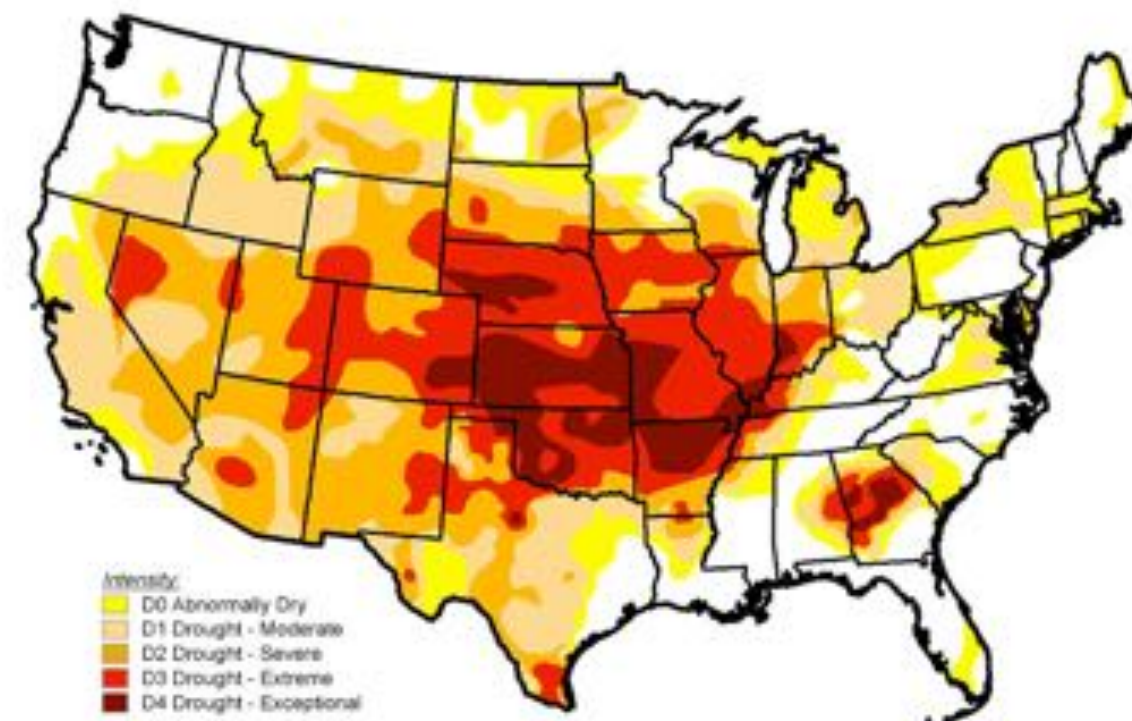


Conclusions



Climate information: Is it useful? Is it usable?

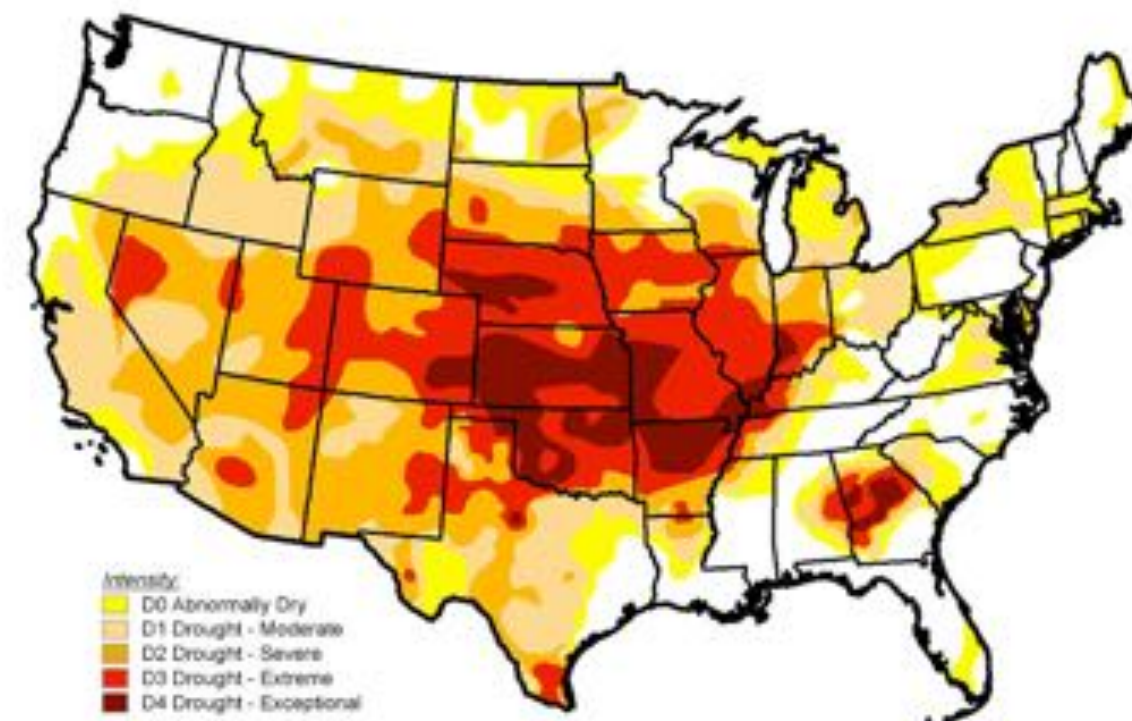
The effects of the 2012 Midwestern US drought on climate change beliefs



J. Stuart Carlton
Texas Sea Grant
Texas A&M
StuartCarlton@tamu.edu

U2U Project
Linda Prokopy, Director
www.AgClimate4U.org

Questions?



J. Stuart Carlton
Texas Sea Grant
Texas A&M
StuartCarlton@tamu.edu

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