

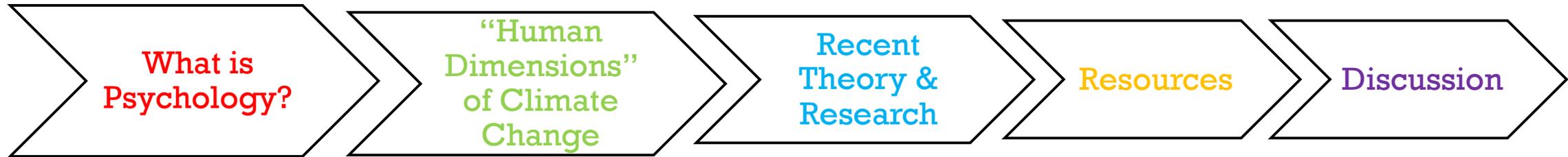
THE BASIS FOR PSYCHOLOGICAL SCIENCE TO UNDERSTANDING GLOBAL CLIMATE CHANGE

Krystal M. Perkins

State University of New York, Purchase College, USA

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OUTLINE OF LECTURE



FIRST THINGS FIRST....



FIRST THINGS FIRST...

- What is Psychology?
 - The **scientific** study of **behavior & mental processes**
 - **Actions, thoughts, emotions, perceptions, reasoning processes, memories, biological activities**
 - **Core values of science:** accuracy, objectivity, skepticism, open-mindedness

FIRST THINGS FIRST...

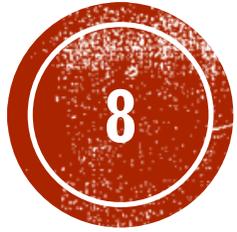
- It is the question of... **What**, **Why**, & **How**?
 - **What** are the biological foundations of behavior?
 - **Why** do people place their own lives at risk to help others?
 - **How** do primates plan, execute, and learn?

FIRST THINGS FIRST...

- What are the **research procedures** used to answer the “what”, “why”, & “how” questions?
 - Main types (**Quantitative**)
 - **Archival:** use of existing data to test hypotheses
 - **Case study:** in depth study of a few people
 - **Naturalistic observation:** observation of some naturally occurring behavior
 - **Correlational approaches:** obtained by administering a survey; measuring two or more variables and examine how they related to each other

FIRST THINGS FIRST...

- What are the **research procedures** used to answer the “what”, “why”, & “how” questions?
 - Main types
 - **Experimentation:** a controlled test of a hypothesis in which the researcher manipulates (changes) one variable to discover (observe) the effect on another variable



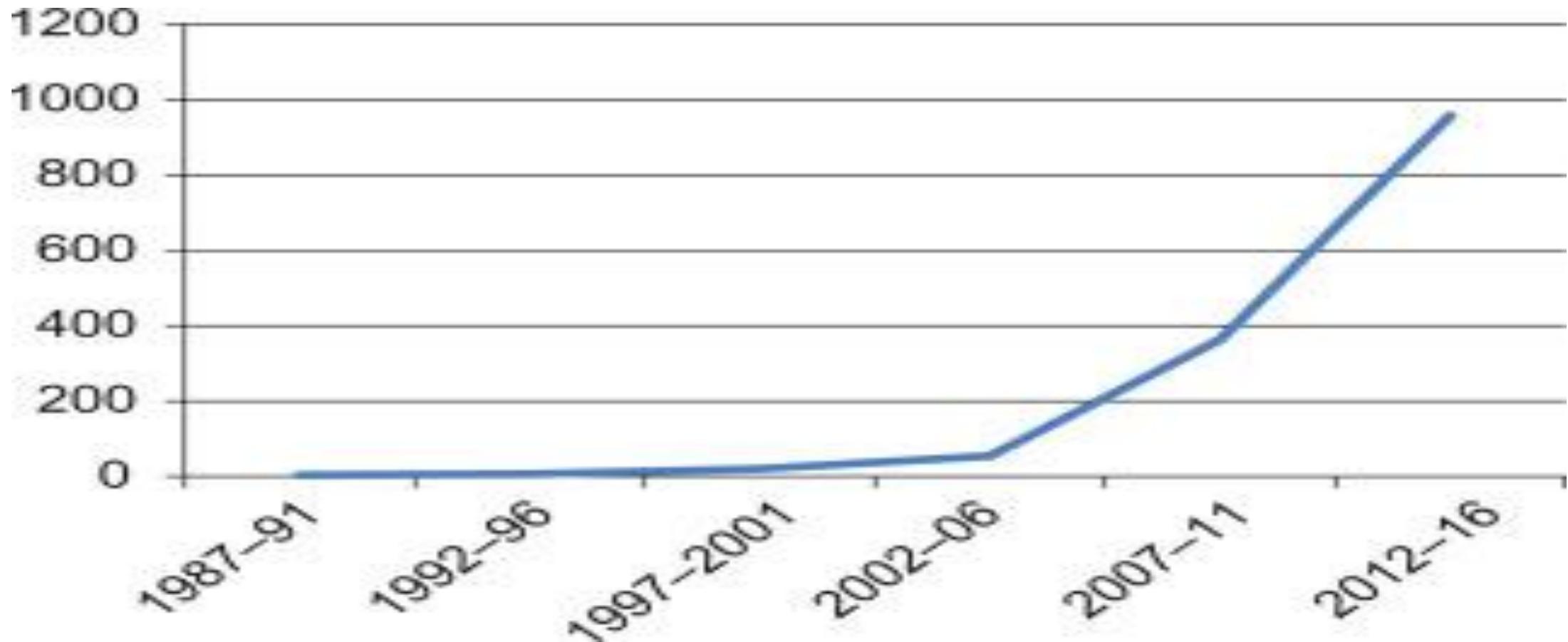
THE STUDY OF CLIMATE CHANGE: A CASE FOR THE “HUMAN DIMENSIONS”



THE STUDY OF CLIMATE CHANGE

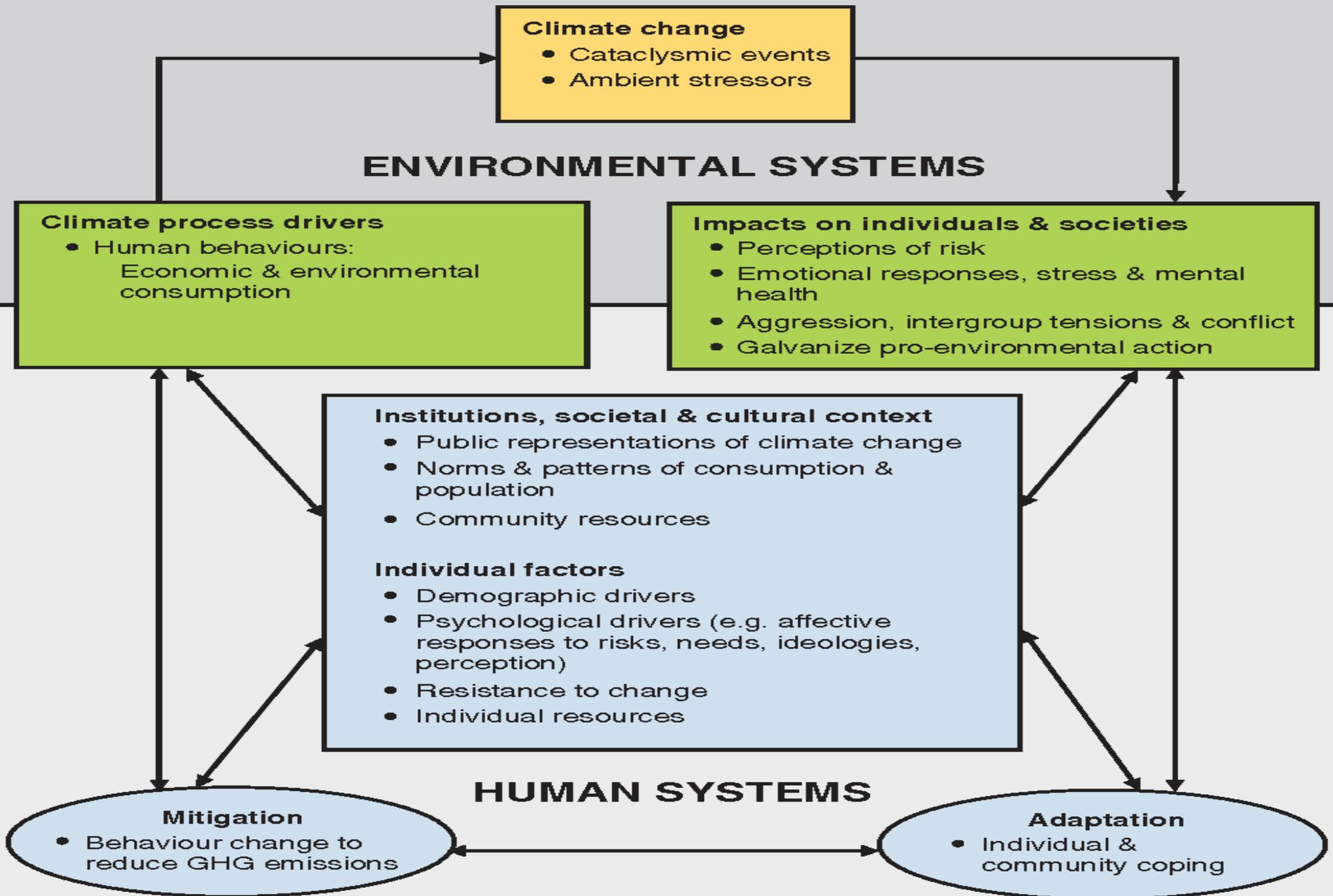
- Engineering, Environmental Science, Biology
- The “**human dimensions**” of climate change

PSYINFO ENTRIES WITH “GLOBAL WARMING” OR “CLIMATE CHANGE” AS KEYWORDS



THE STUDY OF CLIMATE CHANGE

- Engineering, Physics, Chemistry, Biology
- The “**human dimensions**” of climate change
 - **Mismatch** between human beings’ **wants and needs** and natural processes that **maintain** ecological integrity



THE BASIS FOR PSYCHOLOGICAL SCIENCE: RECENT THEORY AND RESEARCH

- How do people **perceive** climate change? What **influences** public perceptions of climate change?
- What are the psychological **barriers** to climate change mitigation?
- How do you **communicate/promote** sustainable behavior?

HOW DO PEOPLE PERCEIVE CLIMATE CHANGE?

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HOW DO PEOPLE PERCEIVE CLIMATE CHANGE? KNOWLEDGE

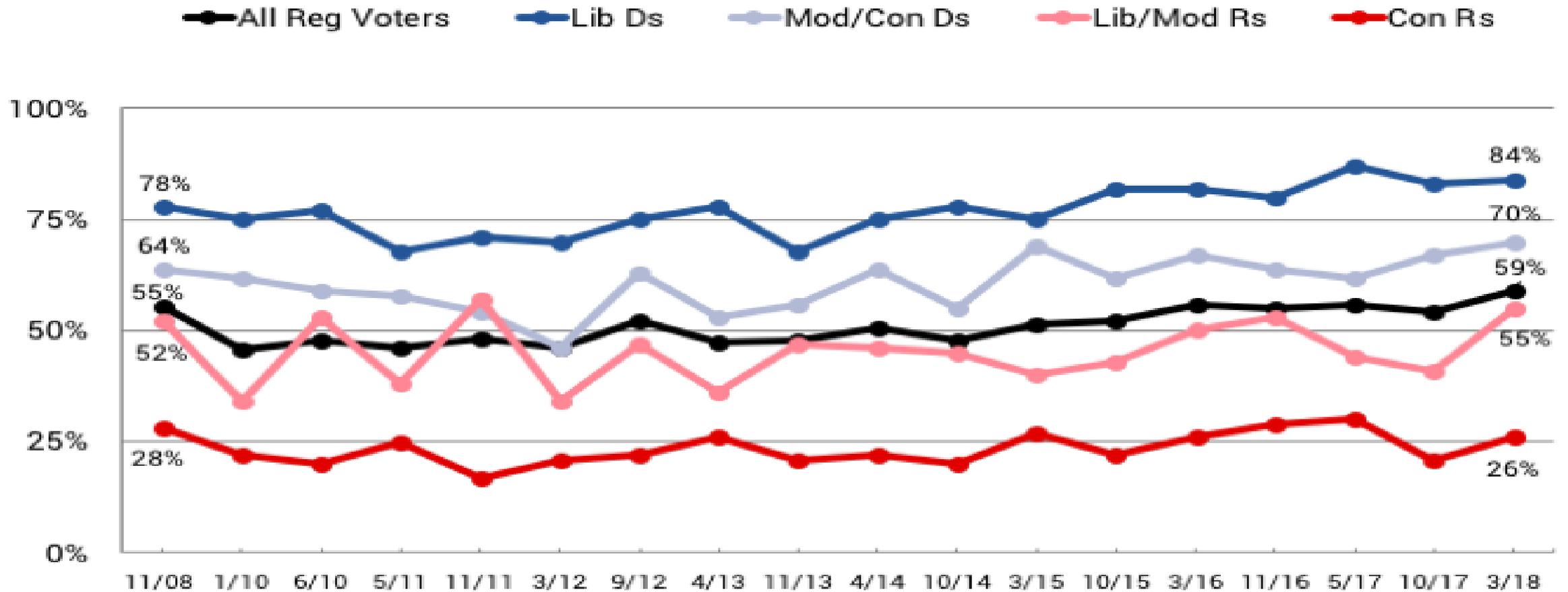
- USA and UK awareness of climate changes nearly **universal**
- Indian subcontinent, Indonesia, Sub-Saharan Africa; **“little to no information”**
- Limited understanding of the **relative contribution** of different activities to climate change (e.g., meat eating/production)

HOW DO PEOPLE PERCEIVE CLIMATE CHANGE?

SKEPTICISM

- 1 in 8 (13%) US Americans think **climate change is not happening**; 59% human caused (Lee, Markowitz, Howe, Ko, Leiserwoitz, 2017)
- Considerable **partisan variation** regarding anthropogenic causes in USA

A Majority of Registered Voters Think Global Warming Is Caused Mostly By Human Activities



Assuming global warming is happening, do you think it is...? (a) caused mostly by human activities; (b) caused mostly by natural changes in the environment; (c) Other (please specify); (d) None of the above because global warming isn't happening. [% responding "caused mostly by human activities"]

March 2018. Base: Registered American Voters.

HOW DO PEOPLE PERCEIVE CLIMATE CHANGE?

SKEPTICISM

- 1 in 8 (13%) US Americans think **climate change is not happening**; 59% human caused (Lee, Markowitz, Howe, Ko, Leiserwoitz, 2017)
- Considerable **partisan variation** regarding anthropogenic causes in USA
- 16% of Germans; 12% UK residents do not think climate is **changing**; 50% human caused (Steentjs et al., 2017)

HOW DO PEOPLE PERCEIVE CLIMATE CHANGE? CONCERN

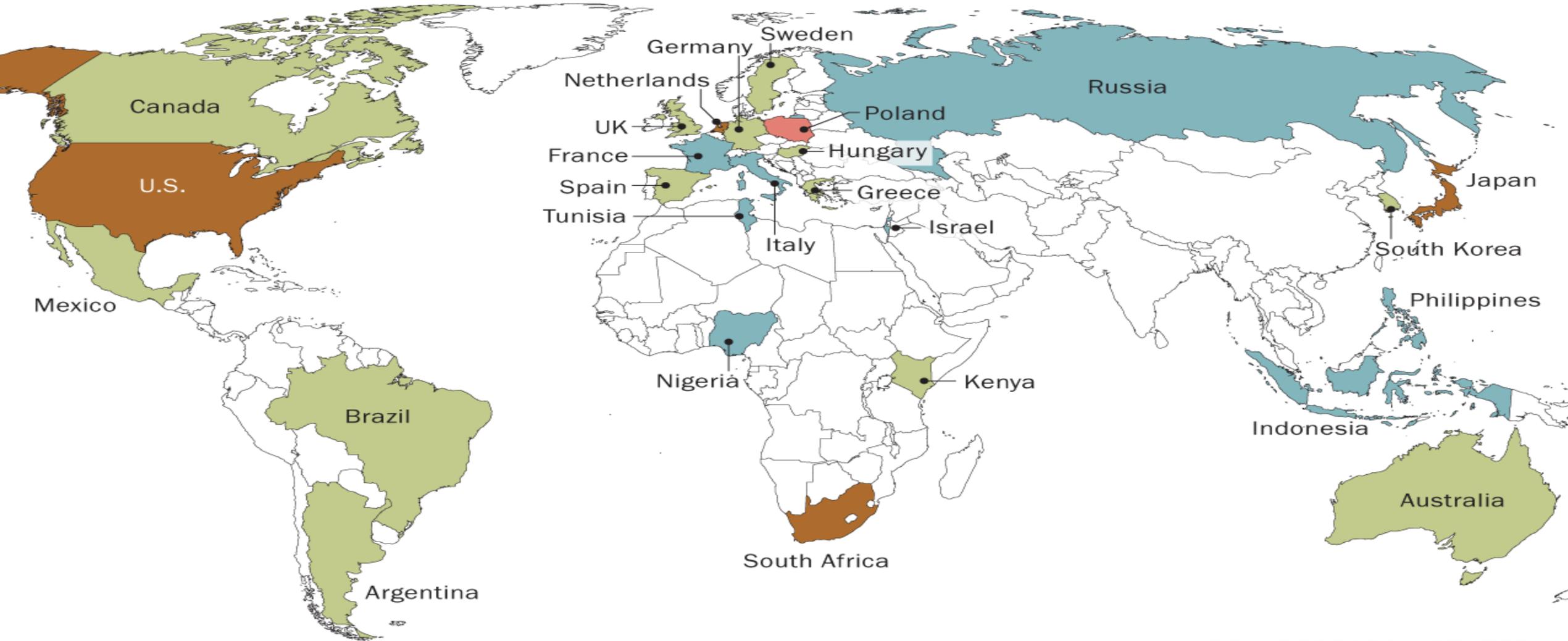
- Most people consider climate change to pose negative consequences
- **Low ranking** of climate change as a concern compared to other issues

TOP CHOICE IS ...

OF COUNTRIES

Global climate change	13
The Islamic militant group known as ISIS	8
Cyberattacks from other countries	4
Russia's power and influence	1

... is a major threat to our country



WHAT INFLUENCES PUBLIC PERCEPTIONS OF CLIMATE CHANGE?

- Values, worldviews, and ideologies are strong predictors of beliefs in and concern about climate change
- **“Motivated reasoning”**: biased assessment of information where people seek out/use information which confirms their existing beliefs and ignores/dismisses information which contradicts beliefs

 **Donald J. Trump** 
@realDonaldTrump  

NBC News just called it the great freeze - coldest weather in years. Is our country still spending money on the GLOBAL WARMING HOAX?

RETWEETS 742 LIKES 459

6:48 PM - 25 Jan 2014

 **Donald J. Trump** 
@realDonaldTrump 

In the beautiful Midwest, windchill temperatures are reaching minus 60 degrees, the coldest ever recorded. In coming days, expected to get even colder. People can't last outside even for minutes. What the hell is going on with Global Warming? Please come back fast, we need you!

9:28 PM - 28 Jan 2019

 **Donald J. Trump** 
@realDonaldTrump

The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive.

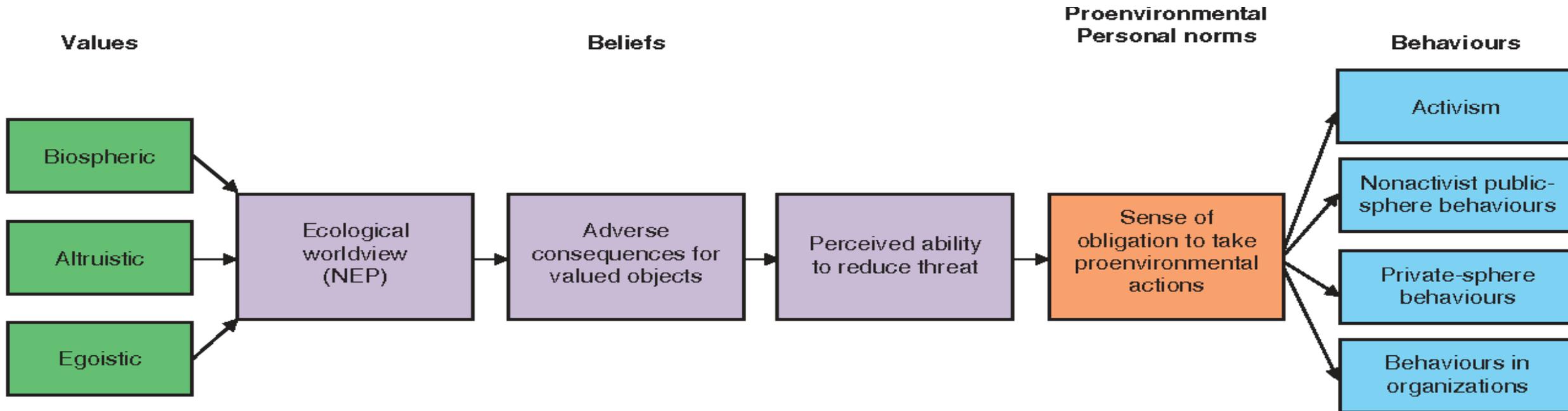
11:15 - 6 Nov 2012

WHAT INFLUENCES PUBLIC PERCEPTIONS OF CLIMATE CHANGE?

- Values, worldviews, and ideologies are strong predictors of belief in and concern about climate change; “**motivated reasoning**”
 - Is the natural world **fragile** or resilient?
 - Are technological advancement and economic growth inherently **good**?
 - What do the rich and powerful **owe** the poor and weak?

WHAT INFLUENCES PUBLIC PERCEPTIONS OF CLIMATE CHANGE?

- Value-Belief-Norm (VBN) Theory of Environmentalism



WHAT INFLUENCES PUBLIC PERCEPTIONS OF CLIMATE CHANGE?

- How do people perceive the **risk** associated with climate change?
 - The general public
 - Stakeholders in environmental conflicts (e.g., farmers)
 - Federal risk assessors and managers



Ecological Worldview + Altruistic Values

SUMMARY: PUBLIC PERCEPTIONS OF CLIMATE CHANGE

- Awareness about climate change has become widespread; concern is more variable
- Values, worldview, and ideology influences perceptions of climate change
- Perceptions of climate changes (concern, risk) is the result of a chain of causality: starts with value of **altruism**



WHAT ARE THE PSYCHOLOGICAL BARRIERS TO CLIMATE CHANGE MITIGATION?

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

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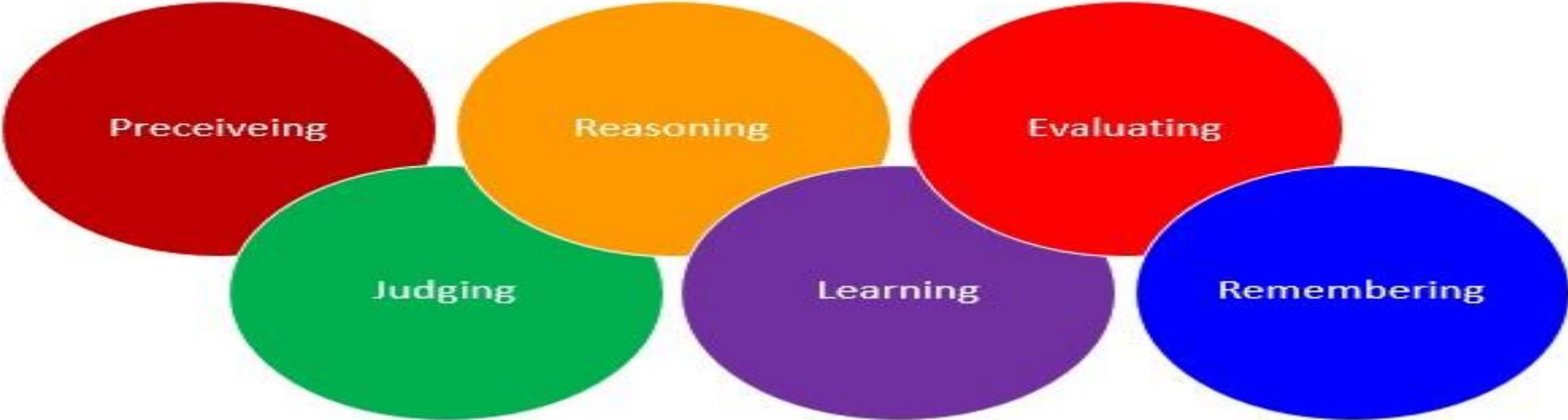
¹ These barriers may well limit change in other troublesome behavior domains, but a discussion of those domains remains for another time.

DRAGONS OF INACTION

Limited Cognition	Belief Systems	Significant Others	Sunk Costs	Discordance	Perceived Risk	Limited Behavior
Ancient Brain	Worldviews	Social comparisons	Financial investments	Mistrust	Functional	Tokenism
Ignorance	Suprahuman powers	Social norms	Behavioral momentum	Perceived program inadequacy	Physical	Rebound effect
Environmental numbness	Technosalvation	Perceived inequity	Conflicting values, goals, aspirations	Denial	Financial	
Uncertainty	System Justification			Reactance	Social	
Judgmental discounting					Psychological	
Optimism bias					Temporal	
Perceived behavioral						

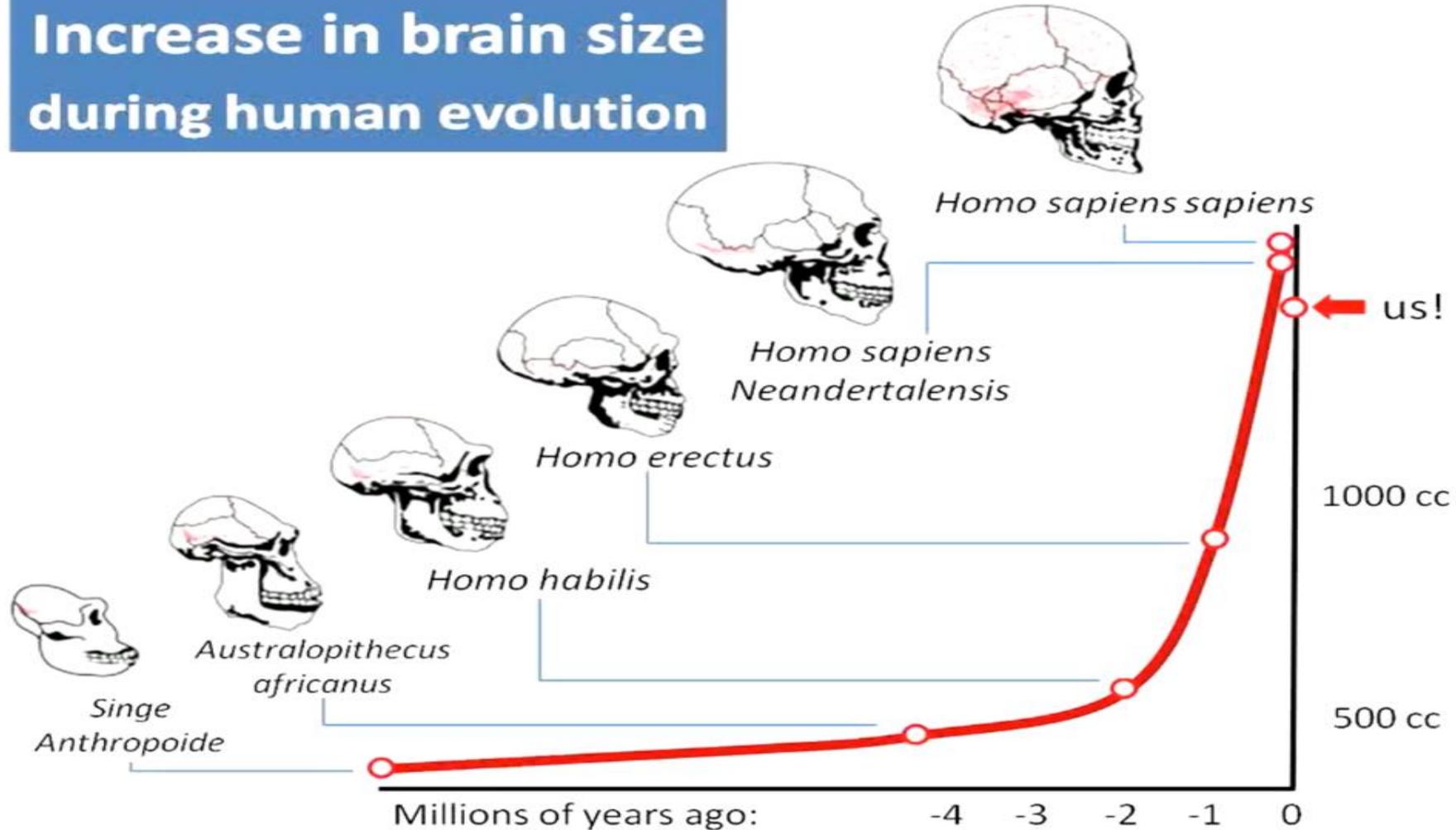
DRAGONS OF INACTION: LIMITED COGNITION

Cognition



DRAGONS OF INACTION: THE ANCIENT BRAIN

Increase in brain size during human evolution



DRAGONS OF INACTION: ANCIENT BRAIN

- Climate change is a “*threat that our **evolved brains** are not uniquely suited to do a dammed thing about*” (Gilbert, 2001)
 - Our brains are most highly tuned to identifying friends, **enemies**, and defectors
 - We are most sensitive to sudden relative changes and tend to **ignore** slow moving-threats
 - We respond to things that we find **indecent**, impious, or repulsive

DRAGONS OF INACTION: OPTIMISM BIAS



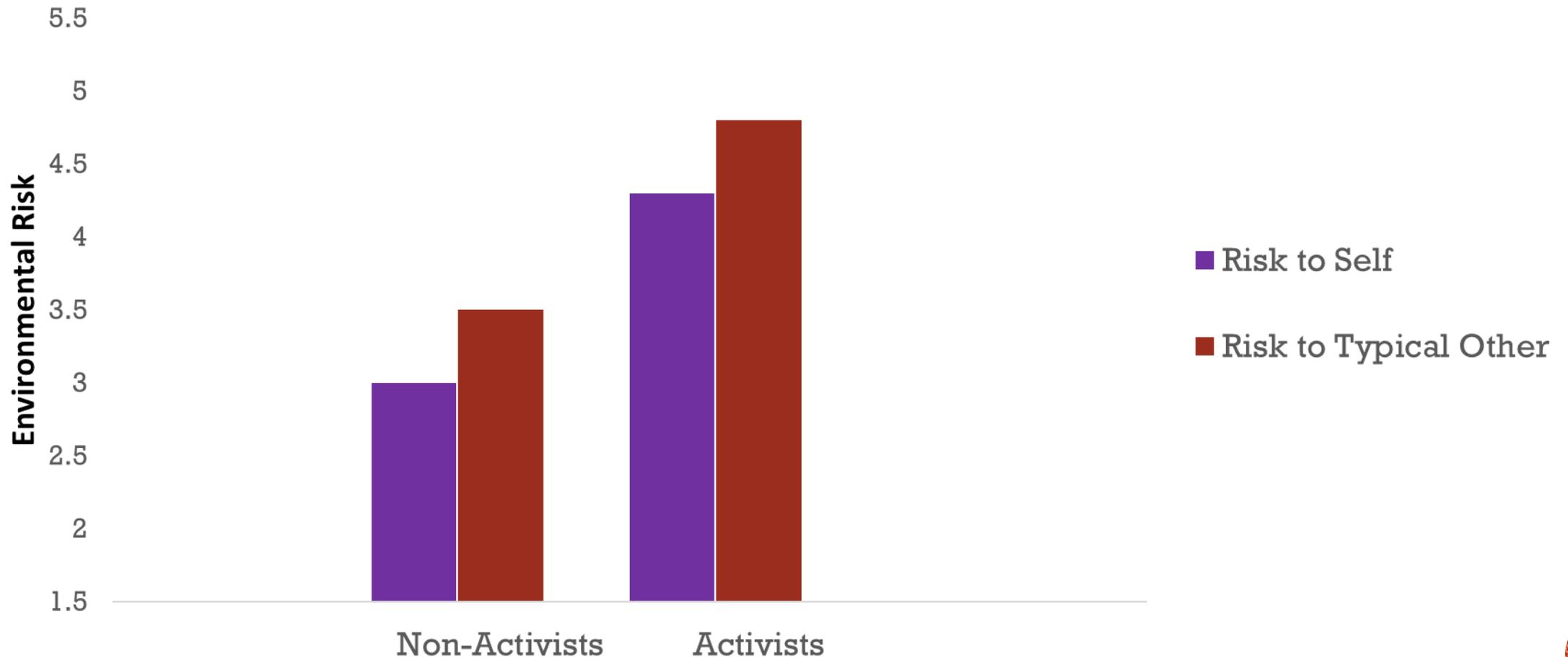
DO PEOPLE DISPLAY COMPARATIVE OPTIMISM FOR ENVIRONMENTAL RISKS?

1. Activists and non-activists rated 26 **environmental risks** for the self: air pollution, water pollution, etc.

2. *“How much at **risk** do you think [**a typical person**] are [is] experiencing harmful effects of each of the following hazards some time in the future?”*

RESULTS: DO PEOPLE DISPLAY COMPARATIVE OPTIMISM FOR ENVIRONMENTAL RISKS?

- Evidence of **comparative optimism**: risks were rated as being higher for a typical person than for the self



$F(1, 82) = 14.57, p = .001, \text{ for risk}$

Pahl, Harris, Todd, & Rutter, 2005

DRAGONS OF INACTION: BELIEF SYSTEMS

- **Worldviews**: a set of beliefs about foundational aspects of the world; wide world perception
 - *Belief in a just world*: motivated tendency to perceive the world as **just, orderly, and stable** (Lerner, 1980)
- Do just world beliefs increase skepticism of climate change?

DO JUST WORLD BELIEF INCREASE SKEPTICISM OF CLIMATE CHANGE?

1. Unscramble words to form a sentence; sentences made view of the world as **just** or **unjust** salient

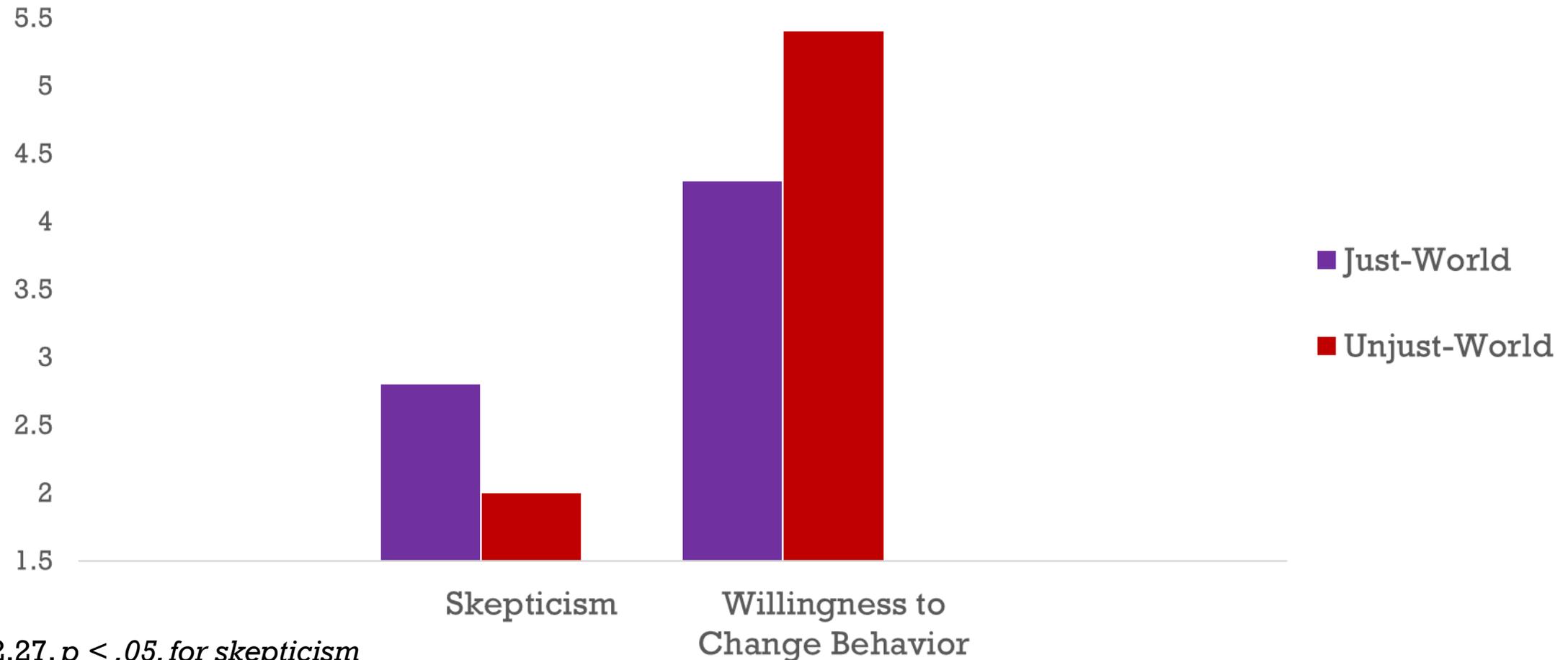
(e.g., “*The world is highly predictable*”)

2. Watched a t.v. advertisement about global warming

3. Answered series of questions: skepticism of climate change and willingness to change their lifestyle

RESULTS: DO JUST WORLD BELIEFS INCREASE SKEPTICISM OF CLIMATE CHANGE?

- Main effect of **prime**; people primed with **just-world** statements reported higher levels of skepticism and less willingness to change behavior compared to **unjust** prime



$t(42) = 2.27, p < .05, \text{ for skepticism}$

$t(42) = -2.35, p < .05, \text{ for behavior}$

DRAGONS OF INACTION: BELIEF SYSTEMS

- **Worldviews**: a set of beliefs about foundational aspects of the world; wide world perception
 - *System Justification*: tendency to **defend, bolster, and, justify** the societal social quo (Jost & Banaji, 1994)



- Do people high in system justification beliefs report greater denial of environmental problems?

DO PEOPLE HIGH IN SYSTEM JUSTIFICATION BELIEFS REPORT GREATER DENIAL OF ENVIRONMENTAL PROBLEMS?

1. System Justification Beliefs Scale

(e.g., “*Society is set up so people usually get what they deserve; In general, the American political system operates as it should*”)

2. New Environmental Paradigm Scale (NEP); 4 subscales focused on denial

(e.g., “*The balance of nature is strong enough to cope with the impacts of modern industrial nations*”)

DO PEOPLE HIGH IN SYSTEM JUSTIFICATION BELIEFS REPORT GREATER DENIAL OF ENVIRONMENTAL PROBLEMS?

	System justification			
	<i>b</i>	<i>SE</i>	β	<i>t</i>
Overall denial of environmental problems	.23	.02	.49	10.15***
Denial of the possibility of an ecological crisis	.31	.03	.49	9.88***
Denial of limits to earth's resources	.18	.04	.26	4.79***
Denial of need to abide by the constraints of nature	.22	.03	.40	7.89***
Denial of danger of disrupting balance in nature	.18	.03	.33	6.25***

*** $p < .001$.

SUMMARY

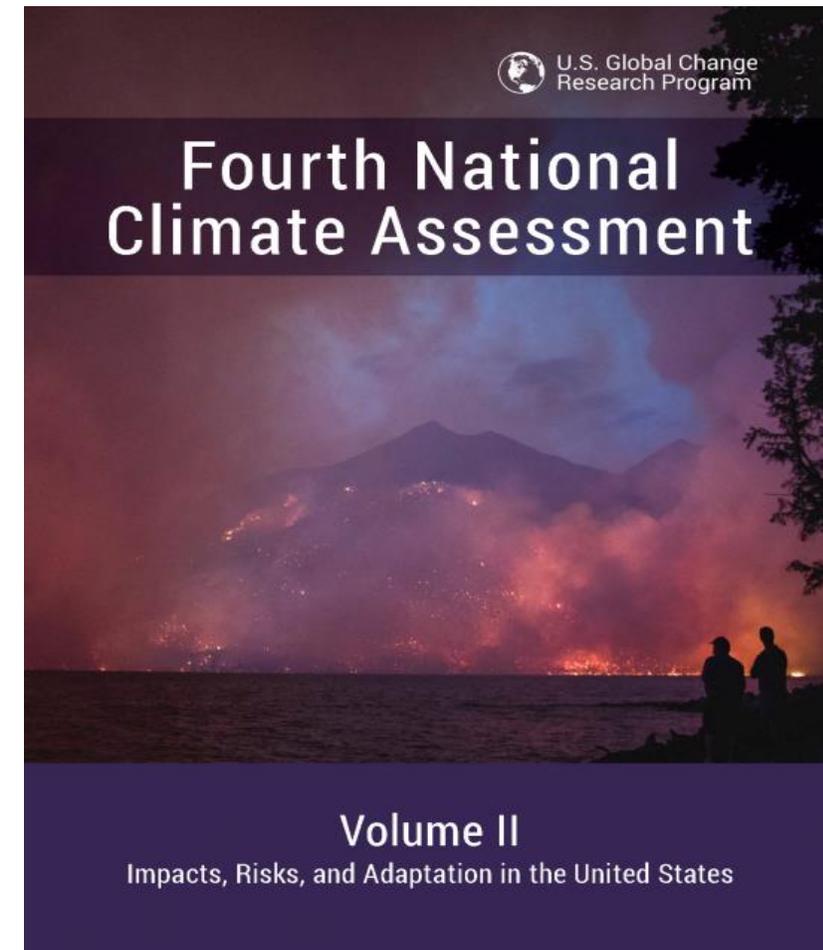
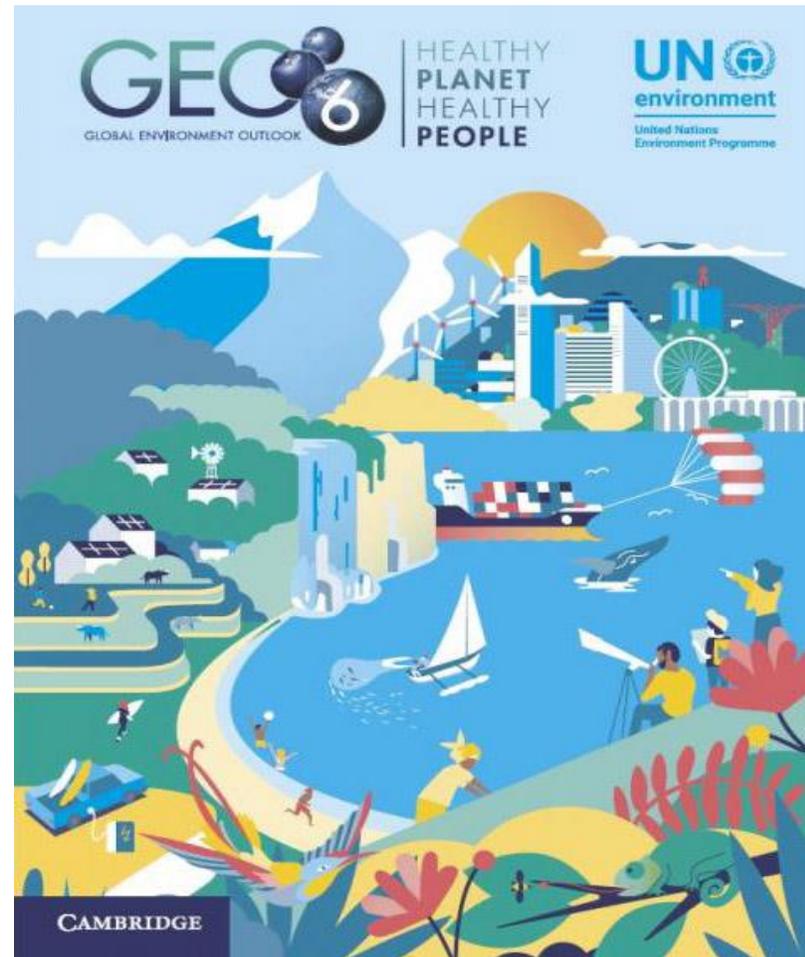
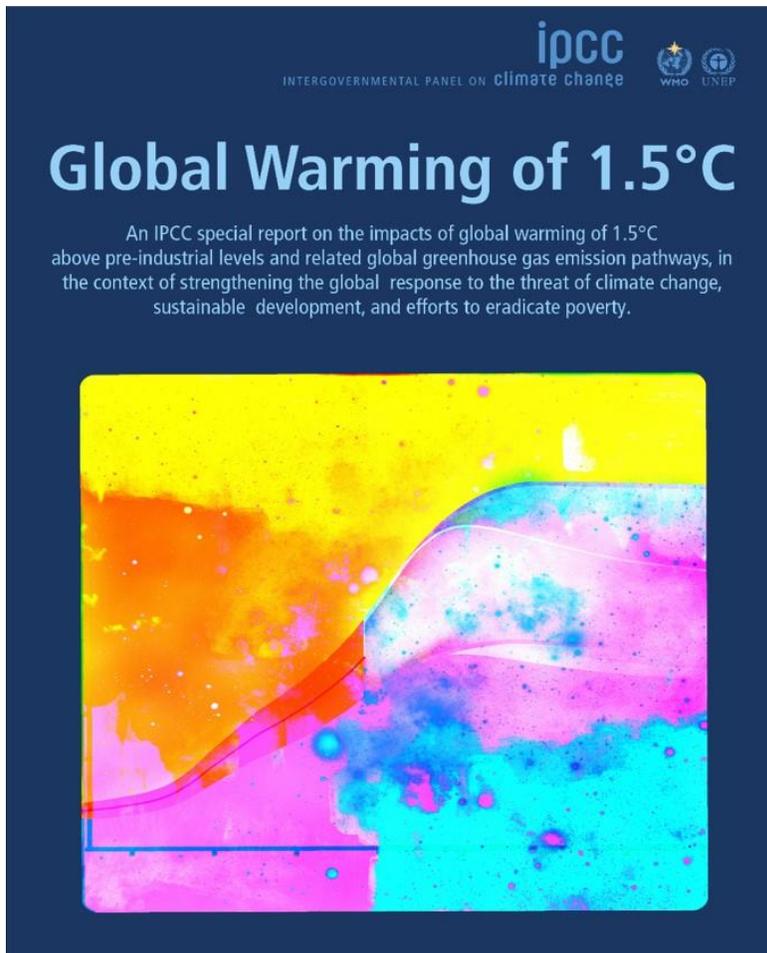
- Numerous psychological barriers to climate change mitigation
- More research and practice are needed
 - Dragons of inactions is an **evolving** list
 - Clarifying the types of barriers faced across different **cultural** contexts
 - **Multiple** (psychological and structural) barriers and climate mitigation



HOW DO YOU COMMUNICATE/PROMOTE SUSTAINABLE BEHAVIOR?



HOW DO YOU COMMUNICATE/PROMOTE SUSTAINABLE BEHAVIOR?



HOW DO YOU COMMUNICATE/PROMOTE SUSTAINABLE BEHAVIOR?

- Disagreements about climate change are very infrequent disagreements over *“the facts”*...disagreements about climate change are fundamentally tied to the implications the *issue holds for society and the way it is organized* (Kahan et al., 2012, 2015).
- **Throwing more and more facts about the problem at people is *extremely unlikely* to shift minds and hearts in an appreciable ways**

INSIGHTS TO IMPROVE CLIMATE CHANGE COMMUNICATION

1. Know what motivates the audience.

- Identify and understand how values, identities, and worldviews, etc. differently shape audiences' engagement with climate change and tailor efforts to their needs.
 - ***“Six Americas Project”*** (Leiserowitz, Maibach, Roser-Renoud, Feinberge, & Howe, 2013)

CLIMATE CHANGE COMMUNICATION: THE SIX AMERICAS



December 2018. Base: 1,114 Americans.



CLIMATE CHANGE COMMUNICATION: SIX AMERICAS PROJECT



DISCUSSION: THE SIX MEXICO'S PROJECT

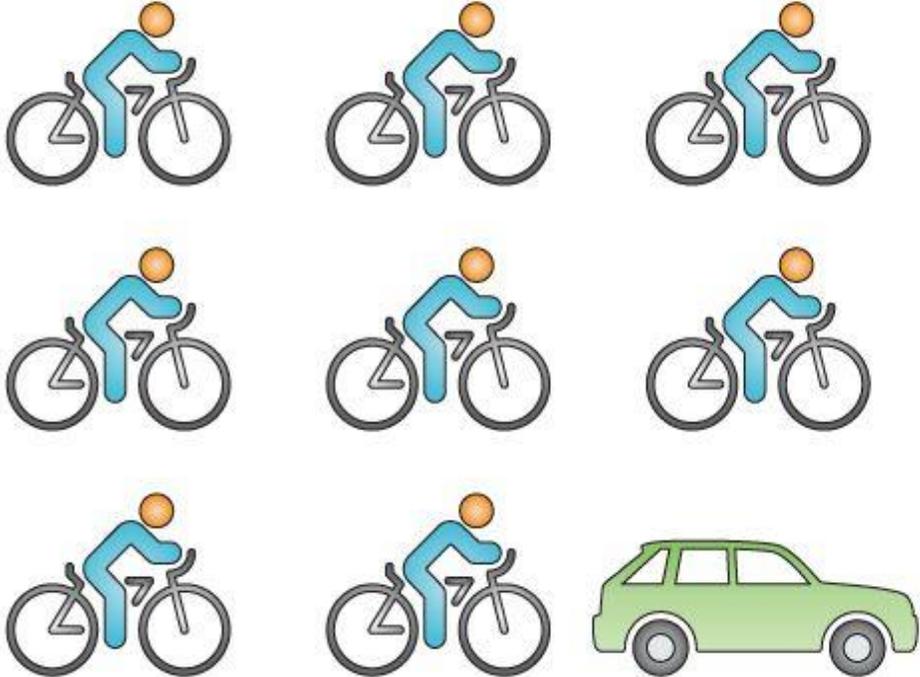
- What are the “the climate change **“worldviews”** of people living in Mexico?
- What are the sustainability messages for these different **“worldviews”**

INSIGHTS TO IMPROVE CLIMATE CHANGE COMMUNICATION

1. Know what motivates the audience.

- Identify and understand how values, identities, and worldviews, etc. differently shape audiences' engagement with climate change and tailor efforts to their needs.
 - **“Six Americas Project”** (Leiserowitz, Maibach, Roser-Renoud, Feinberge, & Howe, 2013)
 - **Social norms** and social beneficial behavior
 - Rules and standards that are understood by members of a group, that guide and/or constrain behavior without force of laws (Cialdini & Trost, 2003, pg., 152)”

TWO TYPES OF SOCIAL NORMS



Descriptive norm for bicycling



Injunctive norm for bicycling

ENCOURAGING SUSTAINABILITY: DO NORMATIVE MESSAGE INFLUENCE SUSTAINABILITY BEHAVIORS?

- 62 hotel rooms; N= 3210 guest stays

(1) Read one of six messages about towel reuse: **high (low) injunctive**; **high (low) descriptive**; combined injunctive descriptive; control group

(2) Recorded number of towels taken out of room per day



PLEASE REUSE THE TOWELS

High (low) injunctive

Many (Some) of our guests have expressed to us their approval of conserving energy. Because so many guests value conservation and are in the habit of conserving, this hotel has initiated a conservation program.

High (low) descriptive

Nearly 75% (25%) of hotel guests choose to reuse their towels each day. To support our guests who want to conserve, this hotel has initiated a conservation program.

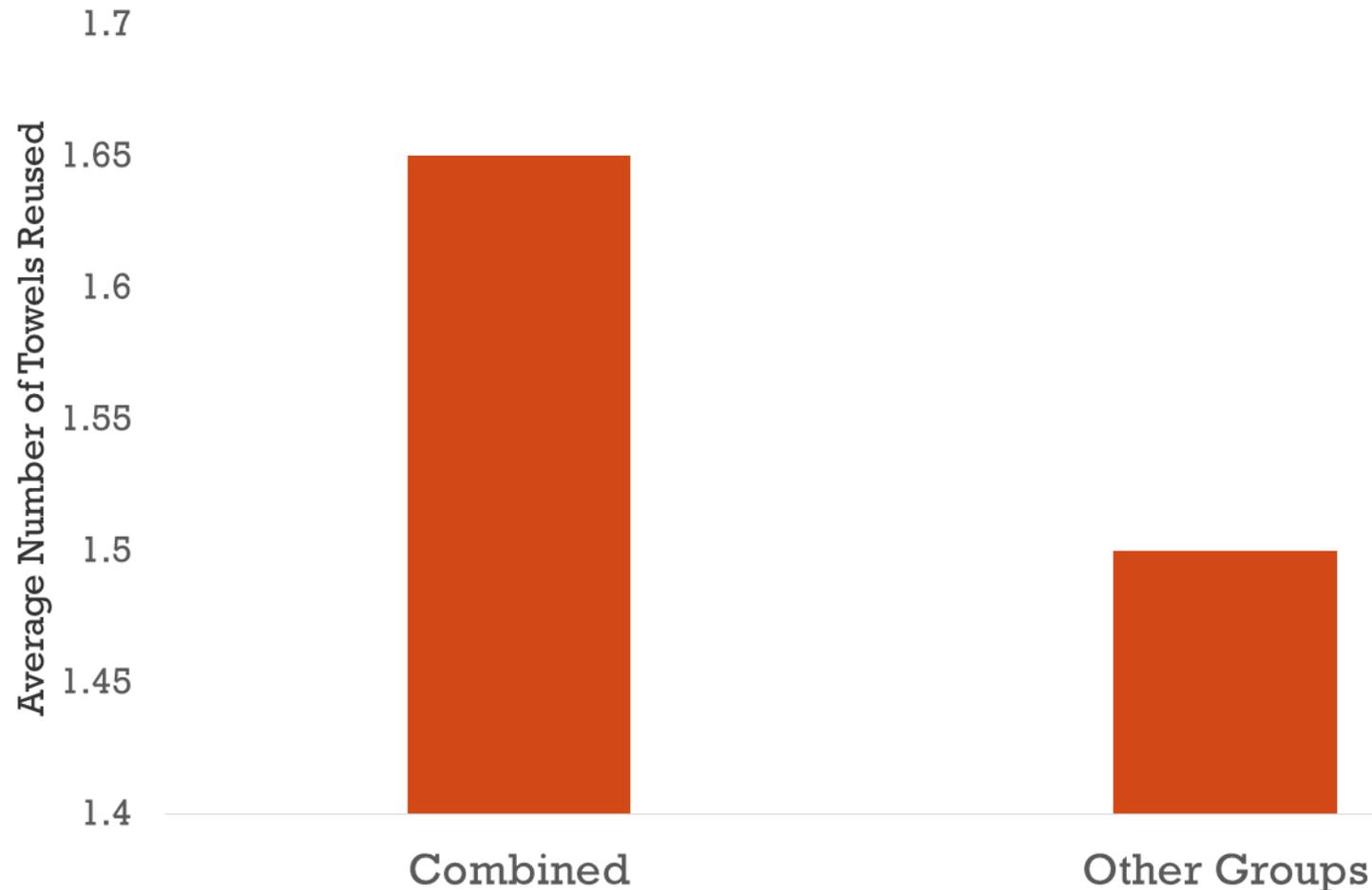


Washing towels every day uses a lot of energy, so reusing towels is one way you can conserve. If you would like your towels replaced, please leave your used towels in the basket on the bathroom floor. Towels left hanging on the towel rack tell us that you want to reuse it.



RESULTS: DO NORMATIVE MESSAGES INFLUENCE SUSTAINABILITY BEHAVIORS?

- Main effect of **message**; people who received **combined message** reused significantly more towels compared to other conditions



$F(5, 2362) = 2.37, p < .05$

Schultz, Khazian, & Zateski, 2008



INSIGHTS TO IMPROVE CLIMATE CHANGE COMMUNICATION

2. Find “frames” that fit audiences needs.

- Use of specific words, images concepts, & metaphors in an effort to increase the salience of specific aspects of an issue and shape how individuals think about it (Druckman, 2001)
- What is the role of **metaphor** in climate communications (Flusberg, Matlock, & Thibodeau, 2017)?

ENCOURAGING SUSTAINABILITY: WHAT IS THE ROLE OF METAPHOR IN CLIMATE COMMUNICATIONS?

(1) Read fictional newspaper article about climate change: “war” vs. “race” against climate change, or control report

1a. **Varied** emission reduction goals

IN RESPONSE TO RECENT PARIS CLIMATE TALKS, THE ASSOCIATED PRESS RELEASED THE FOLLOWING BRIEF STATEMENTS:

War Against Climate Change

When will Americans start to **combat** excessive energy use and **kill the problems** related to air pollution and the destruction of natural resources? **The entire country should be recruited to fight this deadly battle.** The USA is **joining the campaign** to reduce its carbon footprint in the next few decades. The USA has approved dozens of projects as part of an effort to reduce greenhouse gas emissions by more than 25% by the year [2025/2115]. The projects will leverage scientific expertise and individual engagement to improve the energy efficiency of cars and buildings, reduce personal energy use, and increase the use of renewable energies such as wind and solar.....This is a **war** we can't afford to lose.

Race Against Climate Change

When will Americans **go after** excessive energy use and **surge ahead on** problems related to air pollution and the destruction of natural resources? The entire country **needs to step up to the line and get in front of this challenging problem.** The USA is joining the **race** to reduce its carbon footprint in the next few decades. The USA has approved dozens of projects as part of an effort to reduce greenhouse gas emissions by more than 25% by the year [2025/2115]. The projects will leverage scientific expertise and individual engagement to improve the energy efficiency of cars and buildings, reduce personal energy use, and increase the use of renewable energies such as wind and solar.....This is a **race** we can't afford to lose.

ENCOURAGING SUSTAINABILITY: WHAT IS THE ROLE OF METAPHOR IN CLIMATE COMMUNICATIONS?

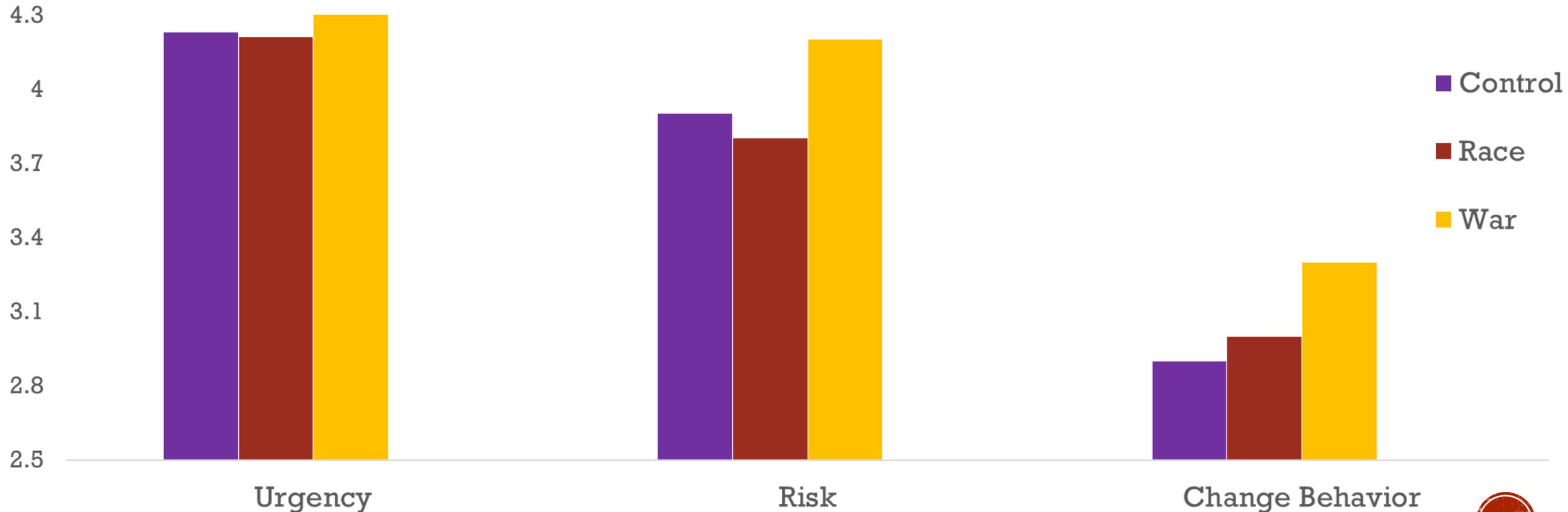
(1) Read fictional newspaper article about climate change: “war” vs. “race” against climate change, or control report

1a. **Varied** emission reduction goals

(2) Answered a series of questions: urgency of the problem, risk perception, willingness to change behavior

RESULTS: WHAT IS THE ROLE OF METAPHOR IN CLIMATE COMMUNICATIONS?

- Main effect of **frame**; people thought climate change was most urgent, risky, and more willing to change their behavior when the article identified climate change as an enemy of **war**



$F(2, 2848) = 3.51, p = .030$, for urgency
 $F(2, 2848) = 5.60, p = .044$, for risk
 $F(2, 1870) = 5.61, p = .001$, for change behavior

INSIGHTS TO IMPROVE CLIMATE CHANGE COMMUNICATION

2. Find “frames” that fit audiences needs.

- “Frames”: use of specific words, images concepts, & metaphors in an effort to increase the salience of specific aspects of an issue and shape how individuals think about it (Druckman, 2001)
 - *What is the role of metaphor in climate communications* (Flusberg, Matlock, & Thiboudeau, 2017)?
 - “Framing” environmental behavior as a means of **preserving the status quo** (Fegina, Jost, & Golsmith, 2010)

DOES FRAMING” ENVIRONMENTAL BEHAVIOR AS A MEANS OF PRESERVING THE STATUS QUO LEAD TO PRO-ENVIRONMENTAL BEHAVIOR?

(1) Read fictional passage about the relationship between people and the environment: **“system preservation”** vs. **“control”** condition

Researchers have always been interested in the state of the natural environment, and have paid attention to how it has changed over the years. Today researchers are especially interested in the relationship between people and the environment.

Being pro-environmental allows us to preserve and protect the American way of life. It is patriotic to preserve the country’s natural resources.

DOES FRAMING” ENVIRONMENTAL BEHAVIOR AS A MEANS OF PRESERVING THE STATUS QUO LEAD TO PRO-ENVIRONMENTAL BEHAVIOR?

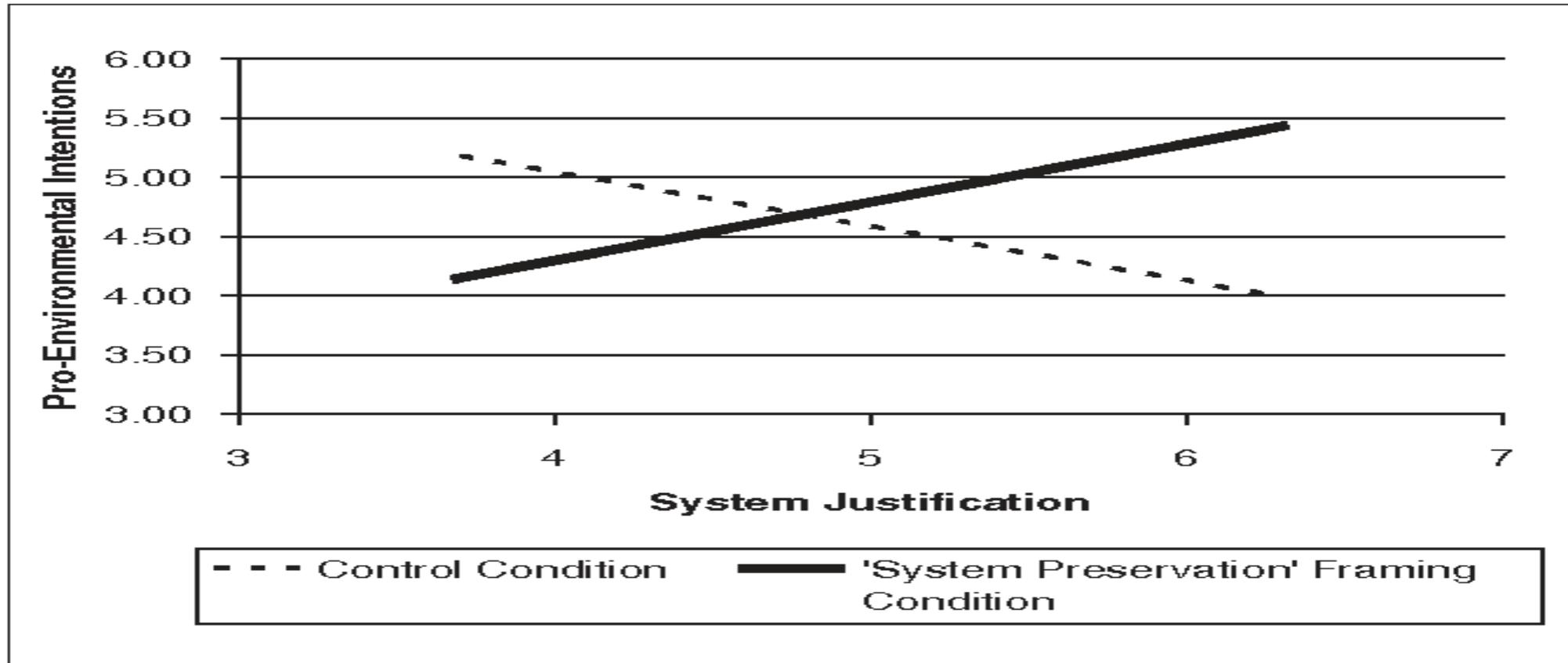
(1) Read fictional passage about the relationship between people and the environment: “**system preservation**” vs. “**control**” condition

(2) Environmental behavioral intentions (e.g., “*I intend to use only recyclable and reusable products from now on*”)

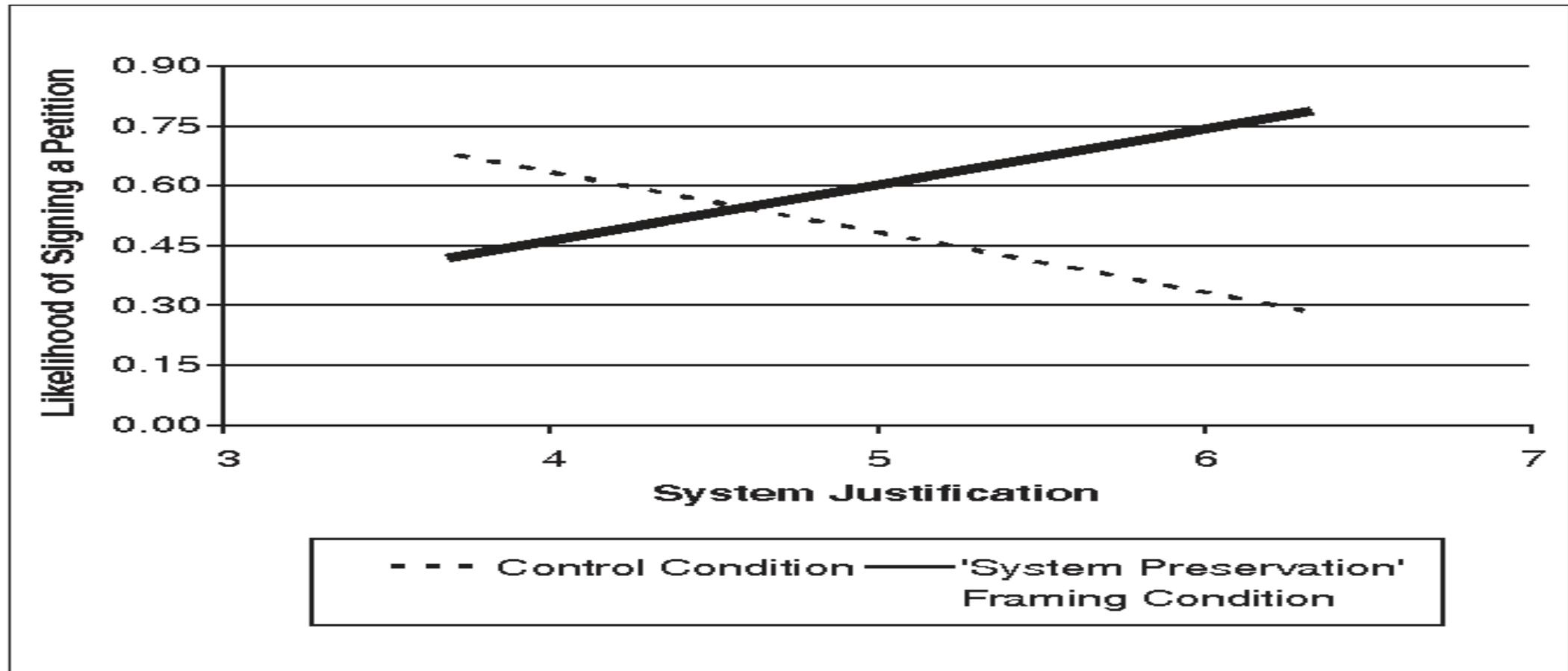
(3) System Justification Beliefs Scale

(4) Will you sign a pro-environmental petition?

RESULTS: DOES FRAMING ENVIRONMENTAL BEHAVIOR AS A MEANS OF PRESERVING THE STATUS QUO LEAD TO PRO-ENVIRONMENTAL BEHAVIOR?



RESULTS: DOES FRAMING ENVIRONMENTAL BEHAVIOR AS A MEANS OF PRESERVING THE STATUS QUO LEAD TO PRO-ENVIRONMENTAL BEHAVIOR?



CONCLUSION

- **Global climate change** is a shared problem
- **Psychology** has a unique perspective and body of knowledge
- **Construct** resolutions developed within a broader climate change community

RESOURCES

- (1) American Psychological Association Division 34: Society for Environmental, Population, and Conservation Psychology; http://www.apadivisions.org/division-34/index.aspx?_ga=2.24453502.59871771.1527134624-1877869644.1527134624
- (2) Psychology and Global Climate Change: Addressing a Multifaceted Phenomenon and a Set of Challenges: A Report by the American Psychological Association; <https://www.apa.org/science/about/publications/climate-change-booklet.pdf>
- (3) American Psychological Association Division 9: The Society for the Psychological Study of Social Issues; <http://www.spssi.org/>