How to be a scientist in a world on fire

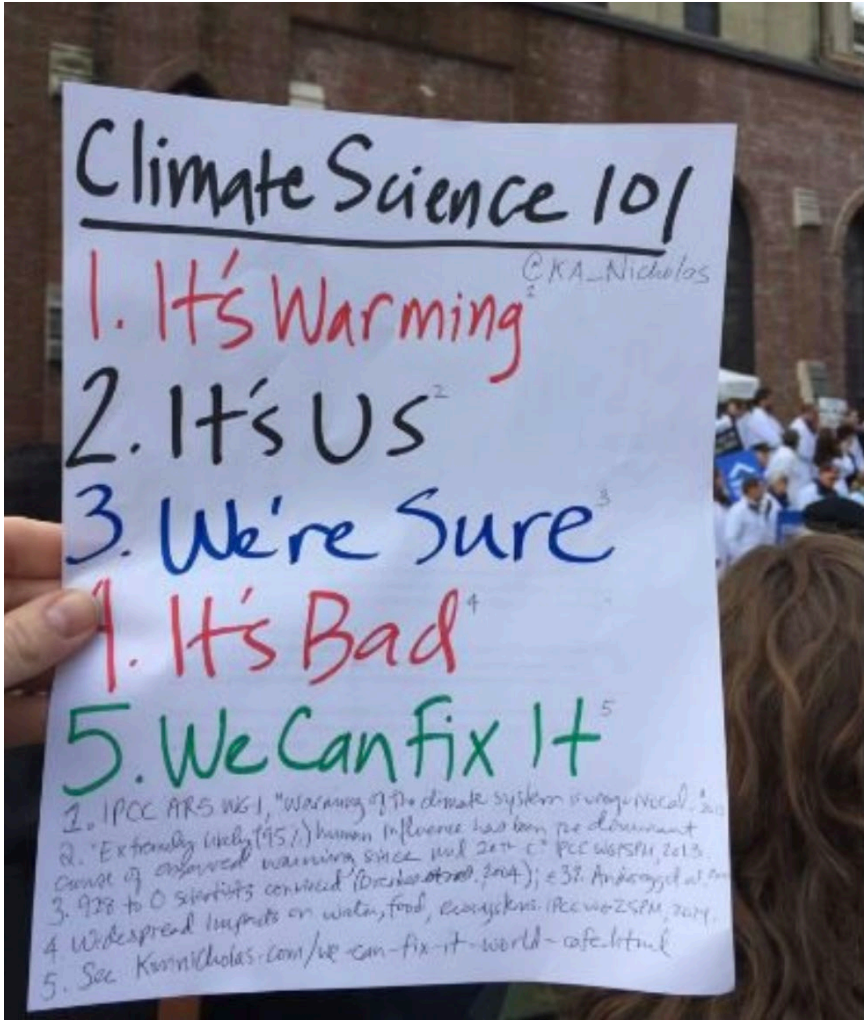
Why the climate crisis concerns (neuro)scientists, and what we can do

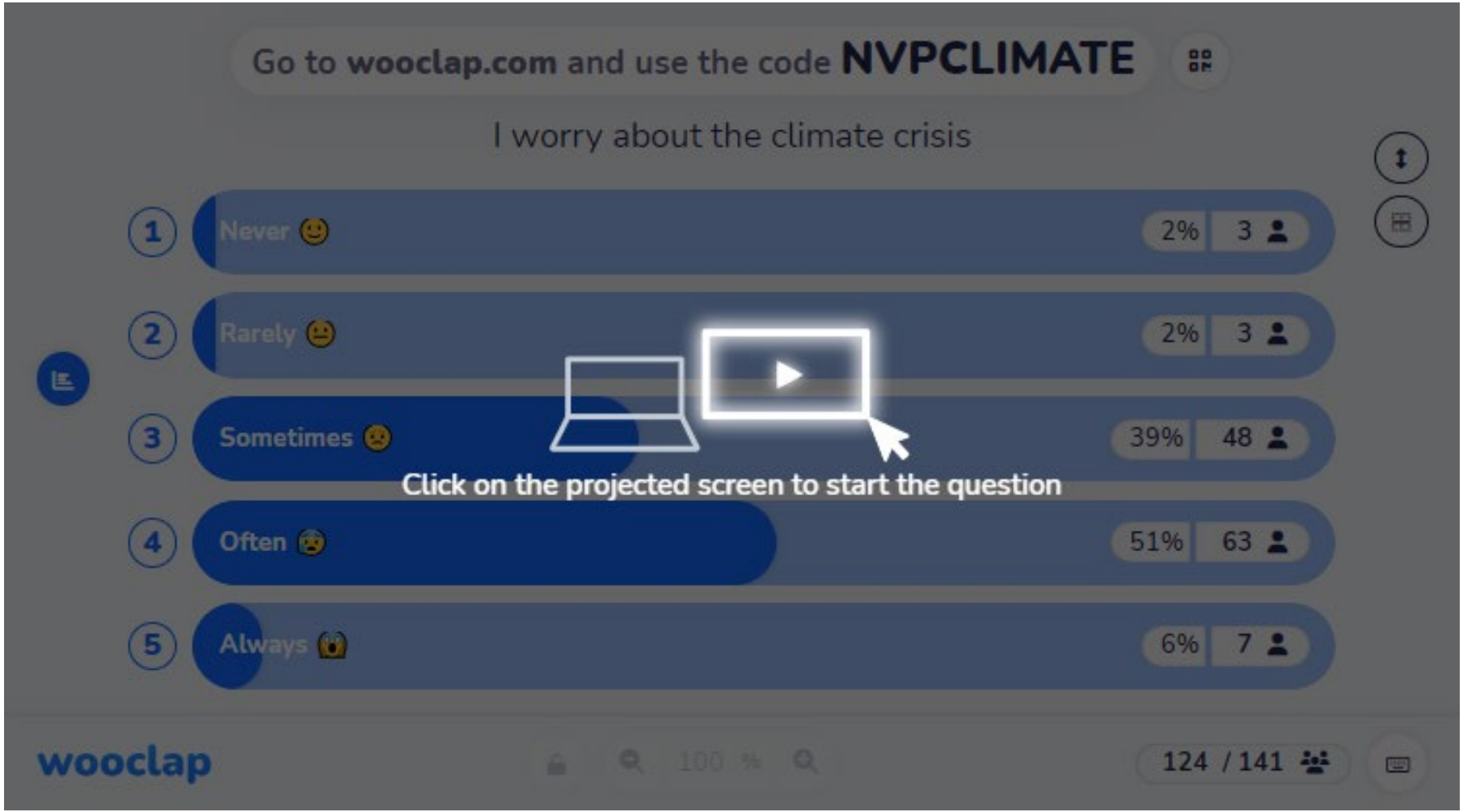
Anne E. Urai
NVP, 15 December 2023

anneurai.net/green-neuroscience

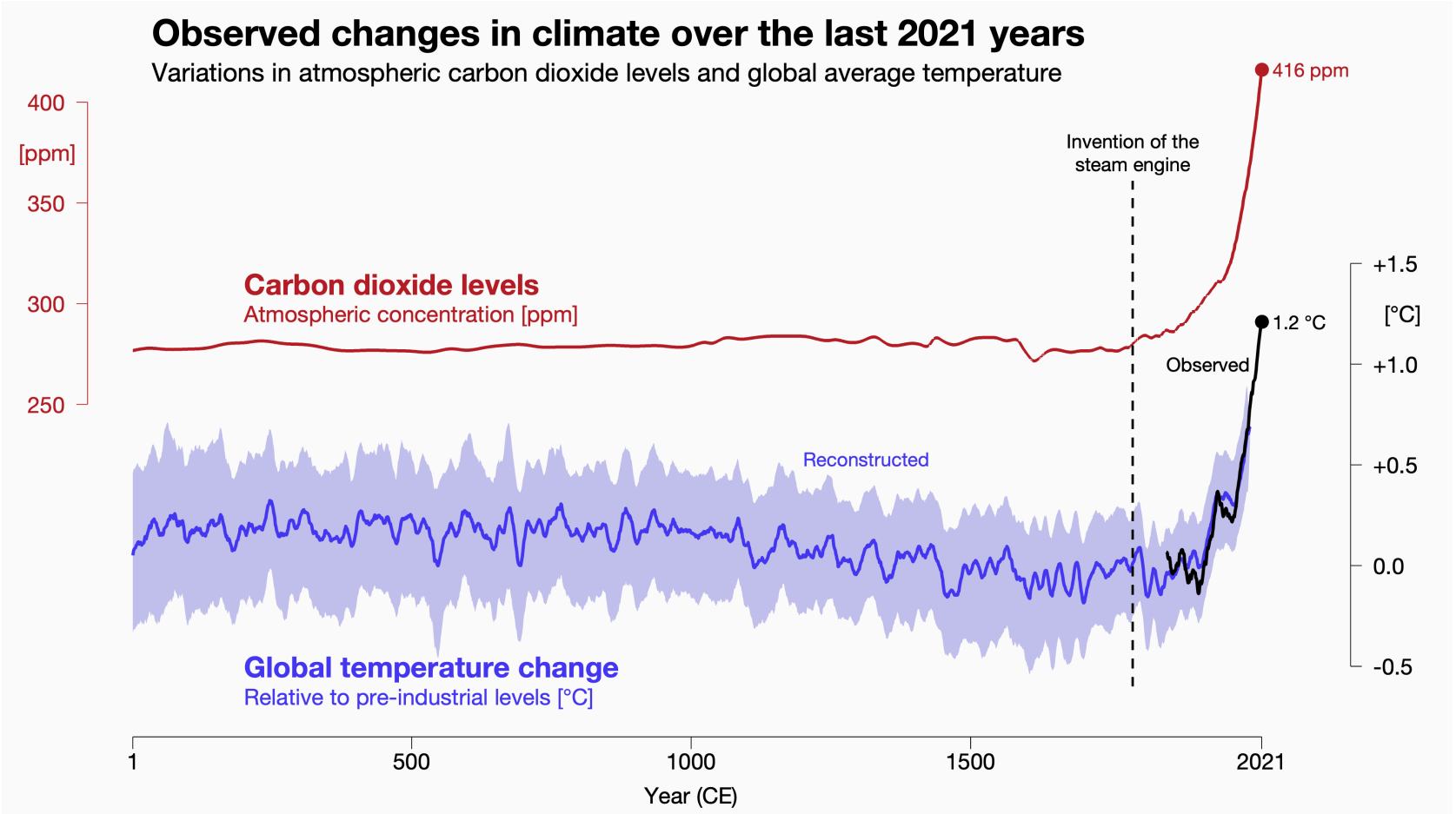
Today

- How I got here
- **Talk**: how bad are things, why should we care, and what can we do?
  45 mins
- **Group discussion**: from worry to action
  30 mins
- **Central wrap-up** and pledges
  15 mins

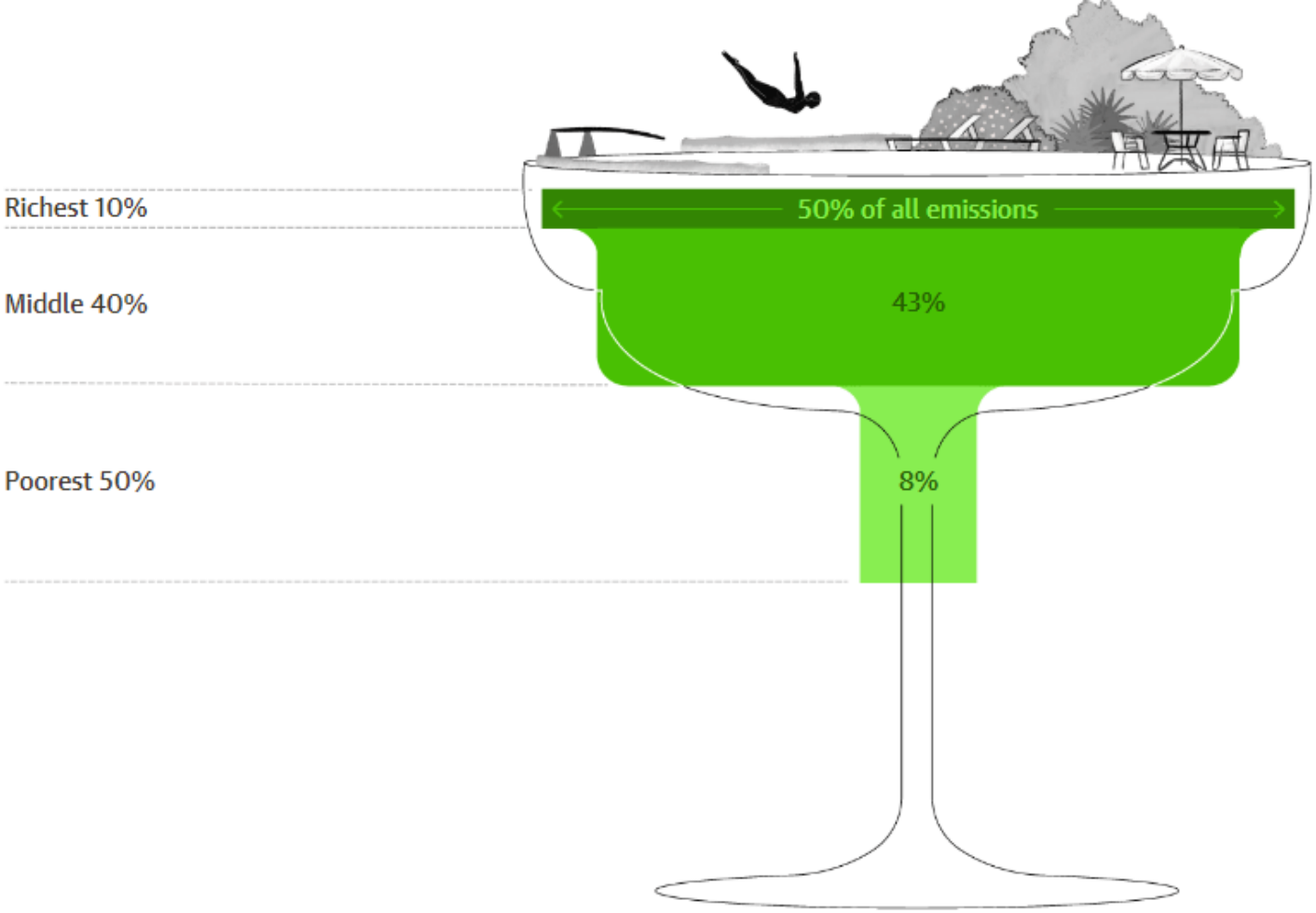

Climate Science 101
©KA_Nicholas
1. It's Warming[1]
2. It's Us[2]
3. We're Sure[3]
4. It's Bad[4]
5. We Can Fix It[5]
1. IPCC AR5 WG1, "Warming of the climate system is unequivocal."
2. "Extremely likely (95%) human influence has been the dominant cause of observed warming since mid 20th C." IPCC WGPSPM, 2013.
3. 928 to 0 scientists convinced (Oreskes et al., 2004); ≥3% Anderegg et al.
4. Widespread impacts on water, food, ecosystems. IPCC WGZSPM, 2014.
5. See KonnicholaS.com/we-can-fix-it-world-cafe.html


Go to wooclap.com and use the code NVPCLIMATE
I worry about the climate crisis
1 Never 2% 3
2 Rarely 2% 3
3 Sometimes 39% 48
Click on the projected screen to start the question
4 Often 51% 63
5 Always 6% 7
wooclap
100 %
124 / 141

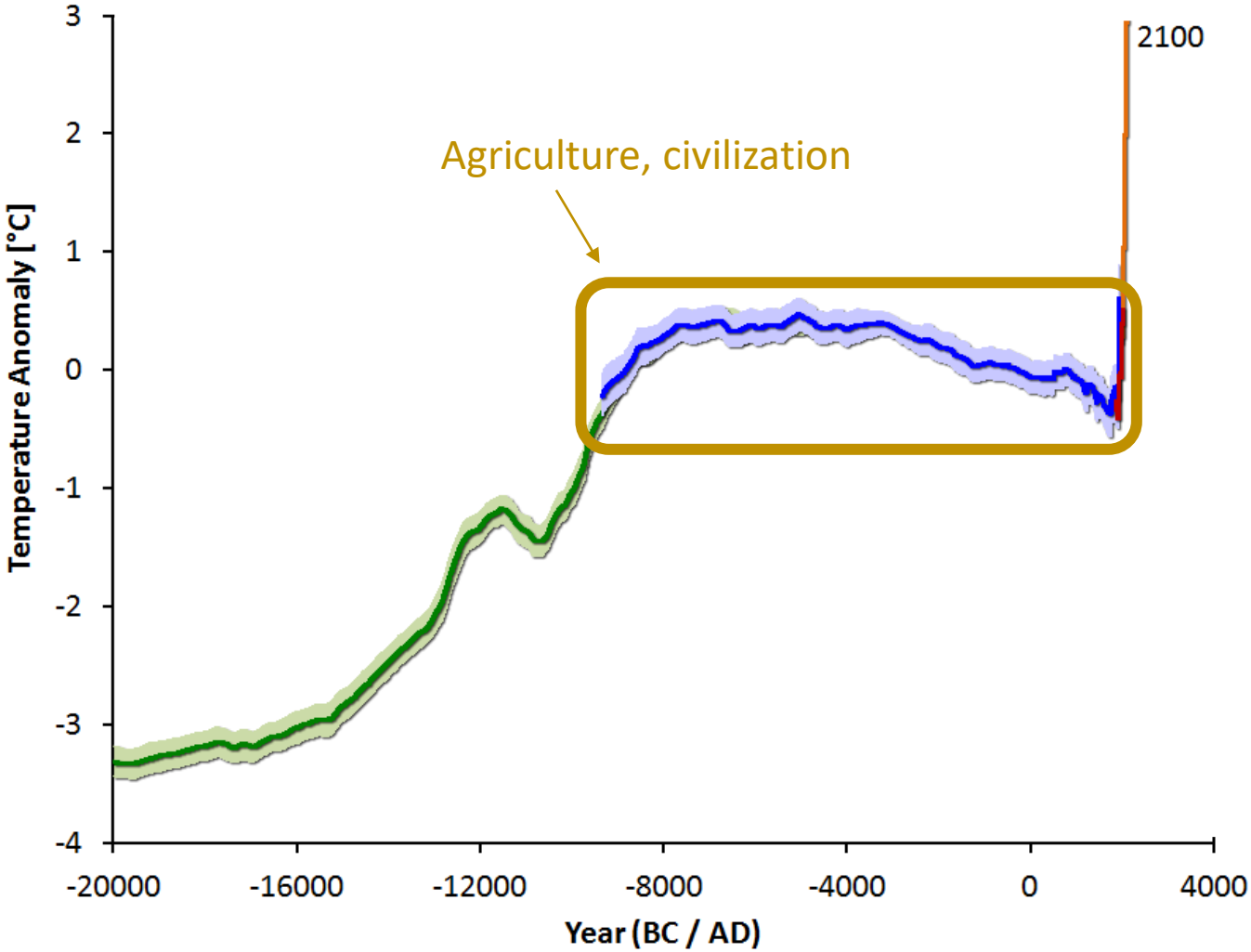
The big picture: our predicament

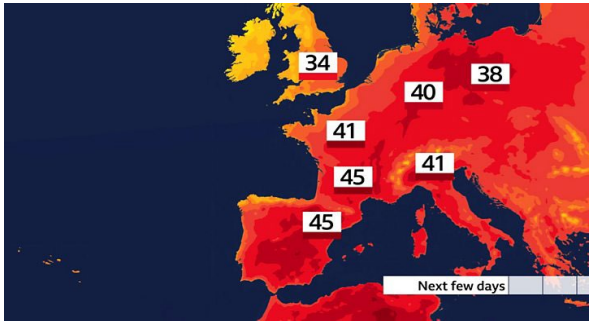


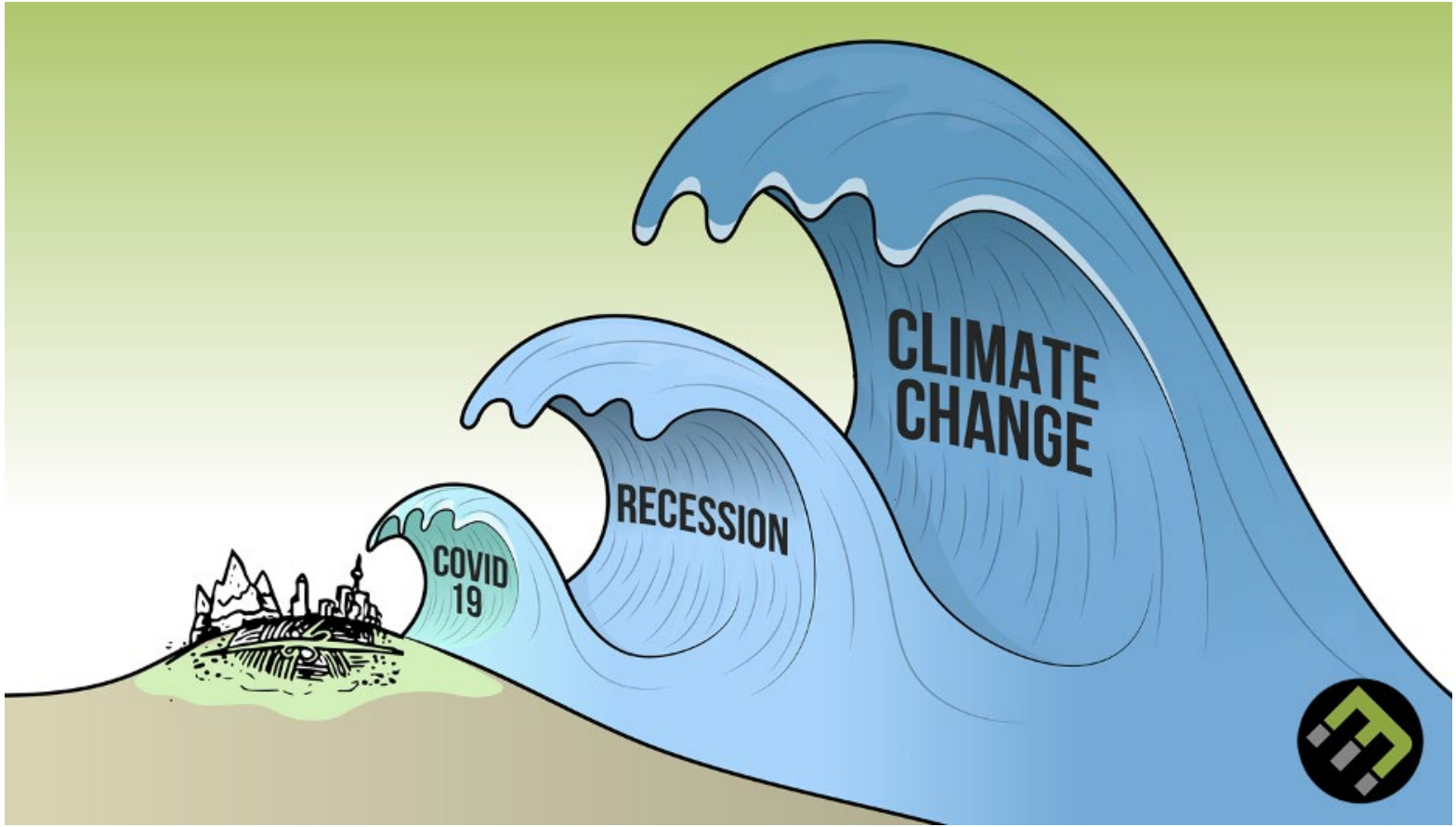
https://github.com/ed-hawkins/climate-visuals



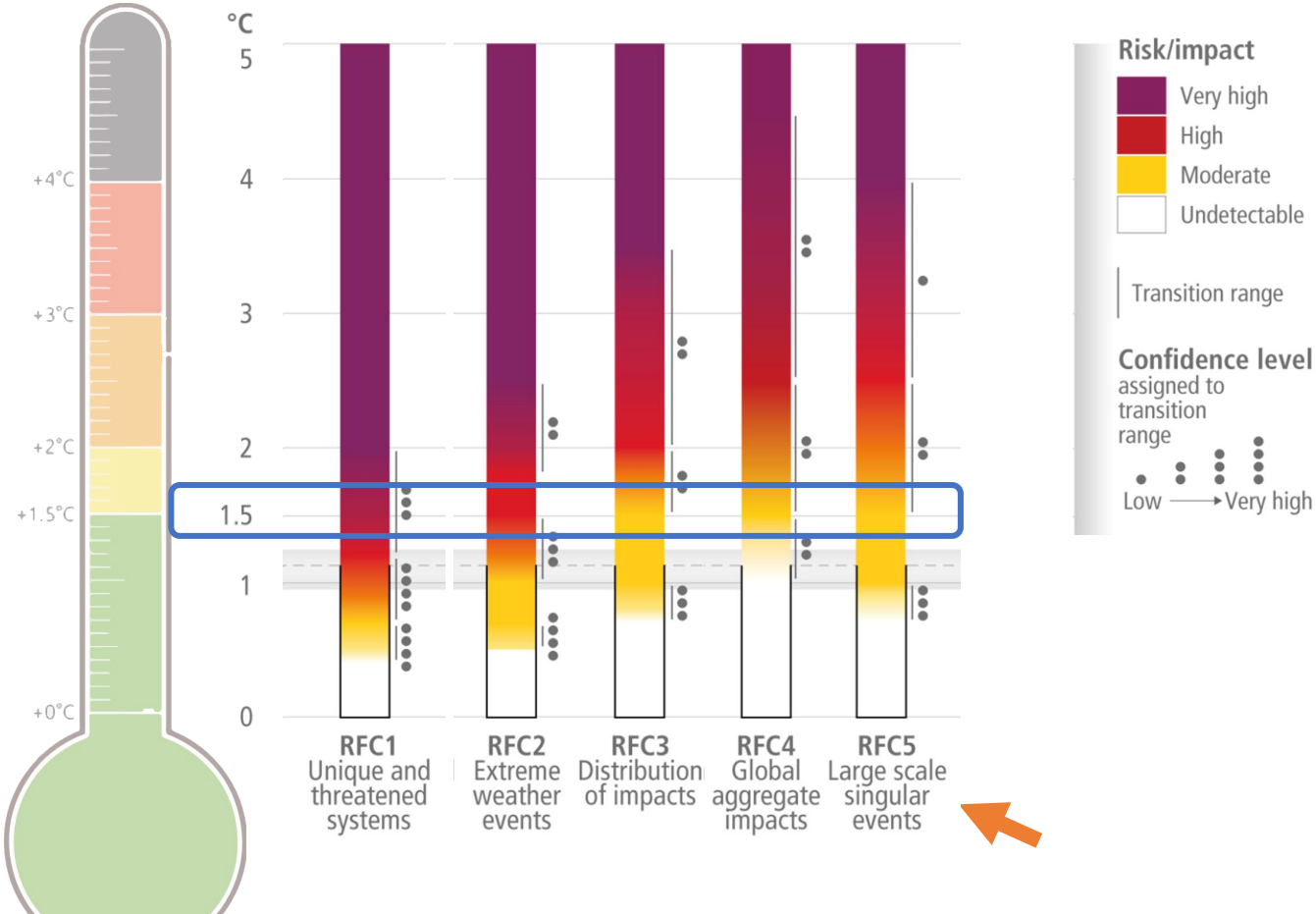
Share of CO2 emissions in 2019, by income group and population
Source: Climate Equality: A planet for the 99%, Oxfam. Note: figures do not add to 100% due to rounding


2100
Agriculture, civilization
Temperature Anomaly [°C]
3
2
1
0
-1
-2
-3
-4
-20000
-16000
-12000
-8000
-4000
0
4000
Year (BC / AD)


34
40
38
41
45
41
45
Next few days

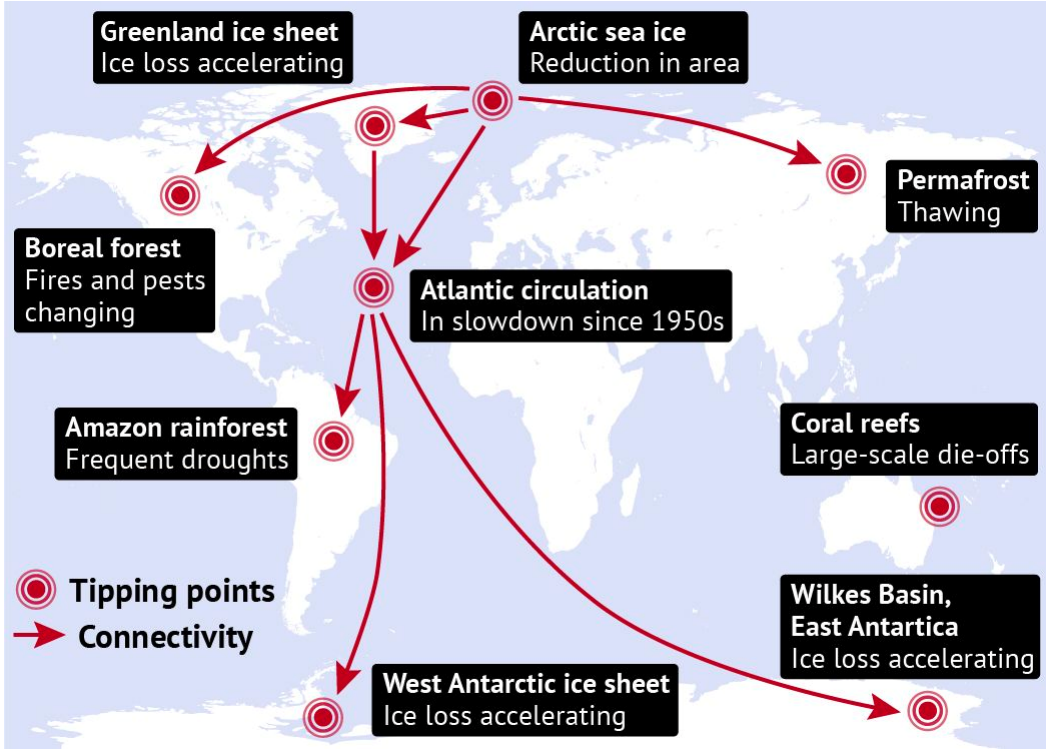

CLIMATE CHANGE
RECESSION
COVID 19

Why 1.5 degree?

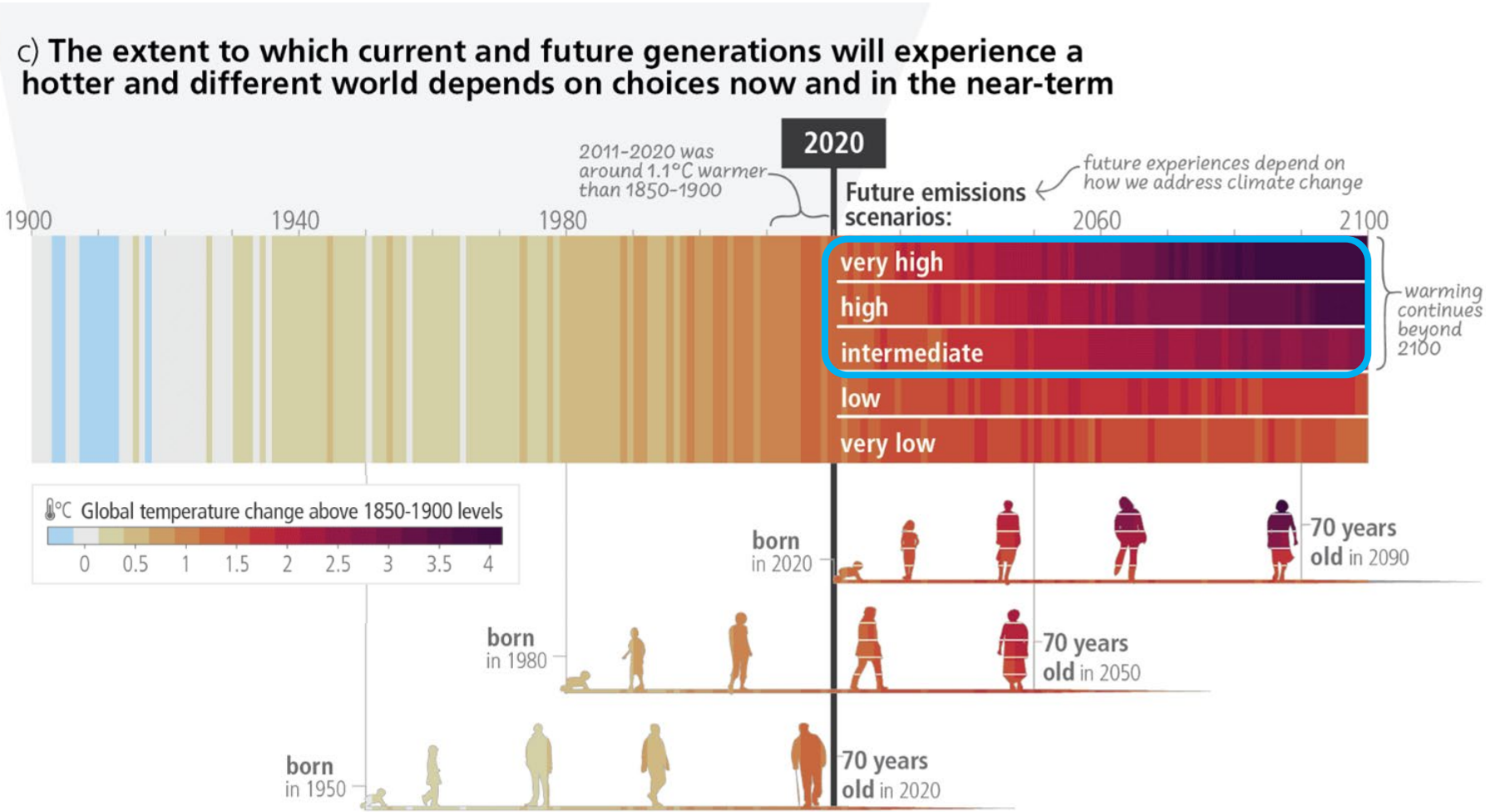


IPCC (2022)

Tipping points



Peter Hannam, "'Tipping points 'dangerously close'", SMH, 28 November 2019.



https://www.ipcc.ch/report/ar6/syr/

It’s bad.

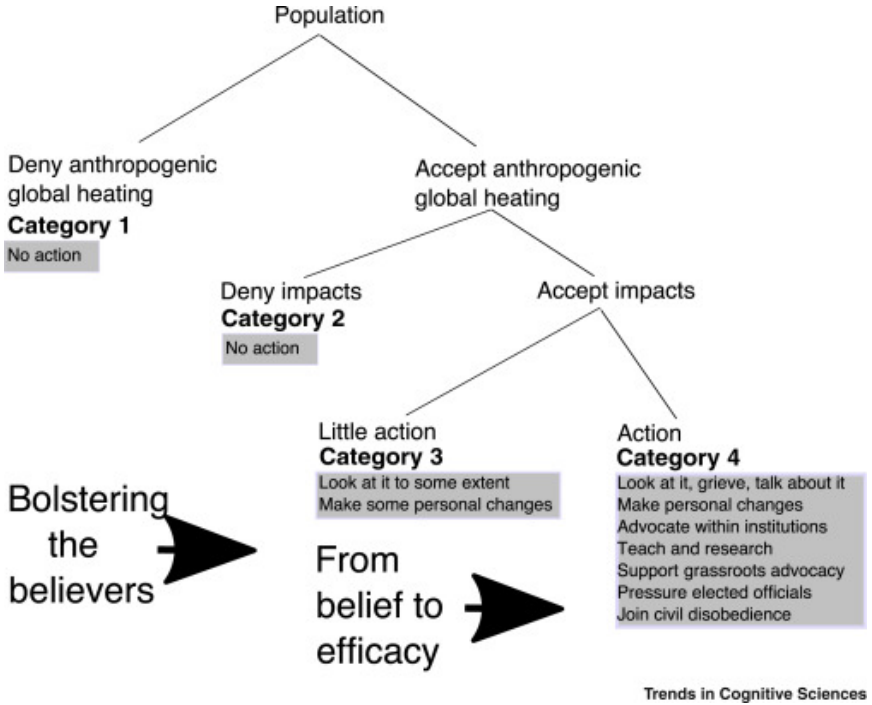
What can we do?

As individuals, citizens, scientists

Taxonomy of climate responses

- *denial* ('it won't be so bad')
- *defeatist* ('what's the point when China is emitting so much')
- *nihilistic* ('human beings suck anyway, we're all doomed')
- *exculpating* ('this is a policy problem')
- *technology-focused* ('devices will suck CO2 out of the air')

- ***efficacy*** ('collective action can ripple and drive major societal and policy change')



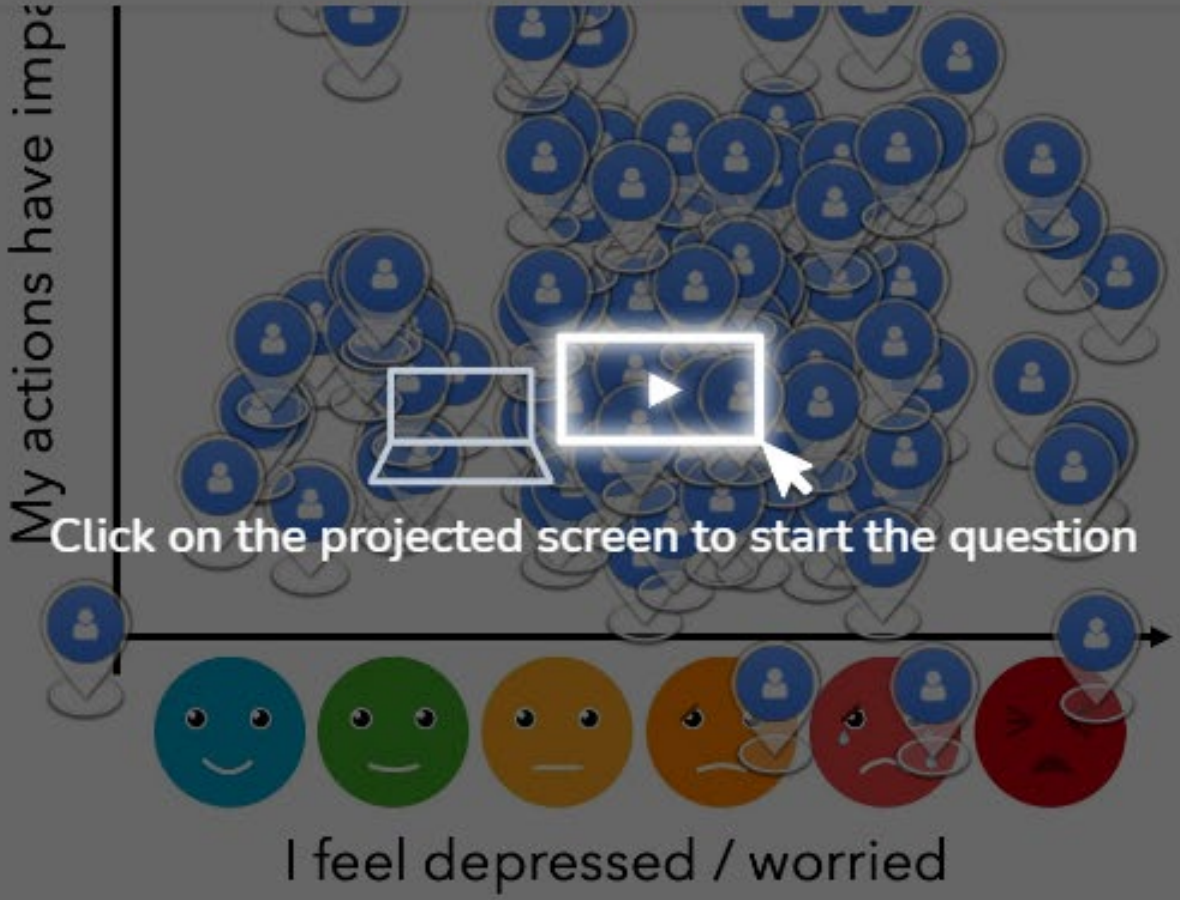
https://doi.org/10.1016/j.tics.2019.08.001

Which best describes your mood at the moment?

denial	3%	3
defeatist	11%	13
nihilistic	20%	23
exculpating	26%	30
technology-focused	9%	11
efficacy	32%	37

Click on the projected screen to start the question

Where do you locate yourself?

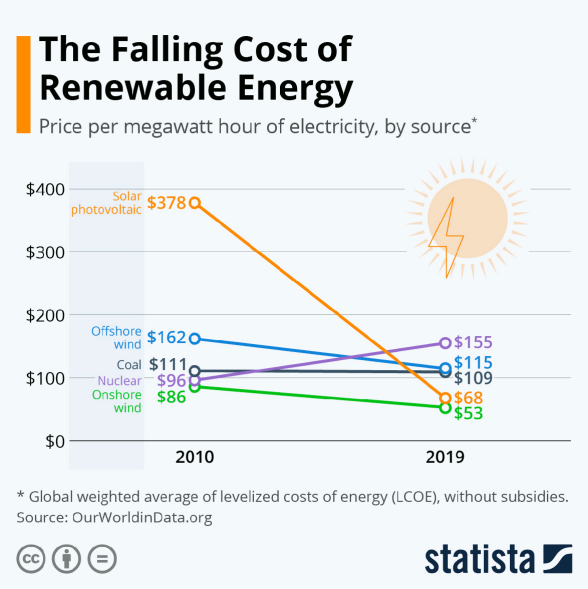


History of systems change

technological - political - social

Future of systems change

technological - political - social



The New York Times

PLAY THE CROSSWORD

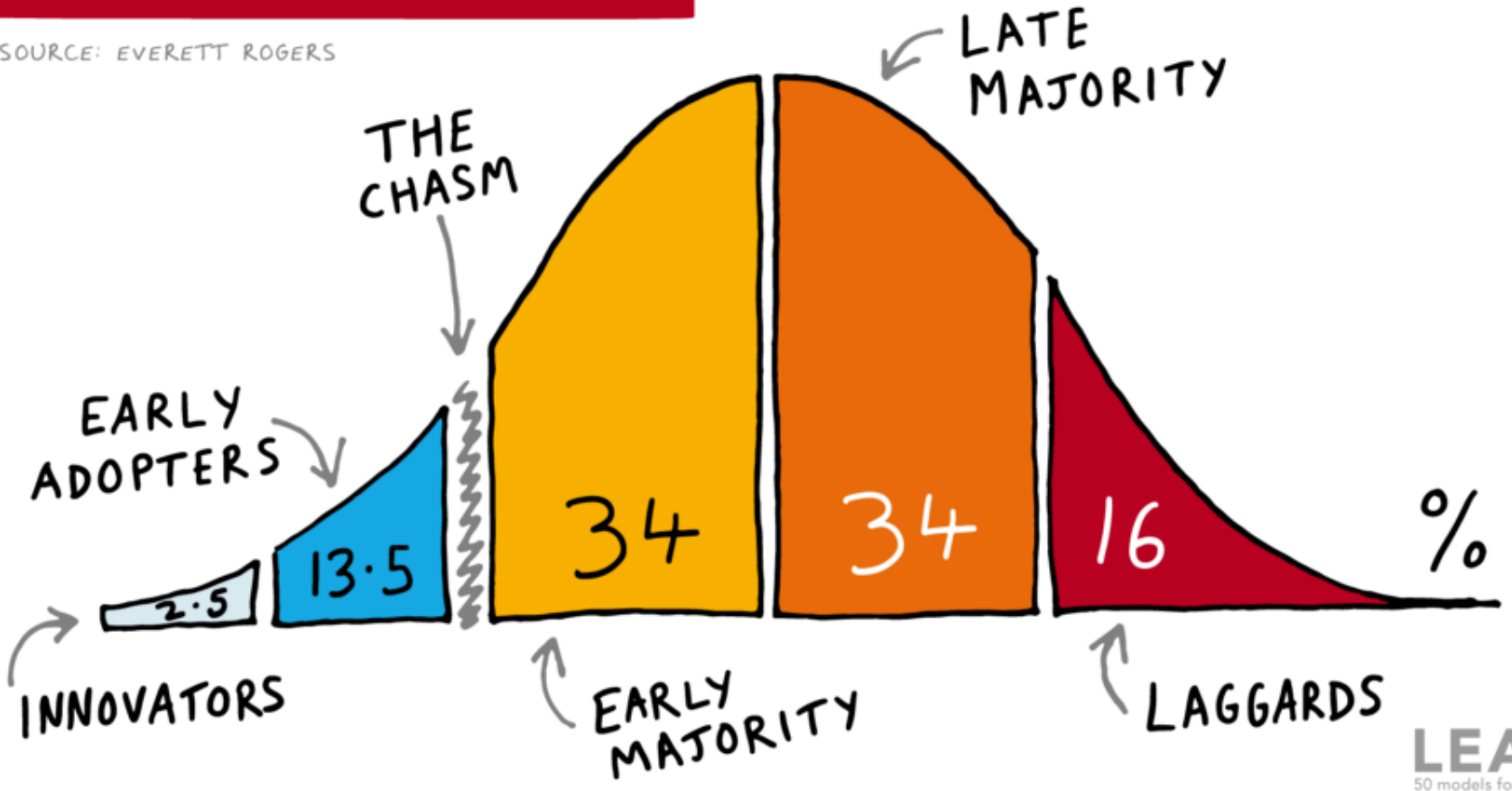
Daily Business Briefing ›

Germany puts a stop to Nord Stream 2, a key Russian natural gas pipeline.

Germany halted certification of the pipeline linking the country to Russia in response to the Kremlin's recognition of two separatist regions in Ukraine.

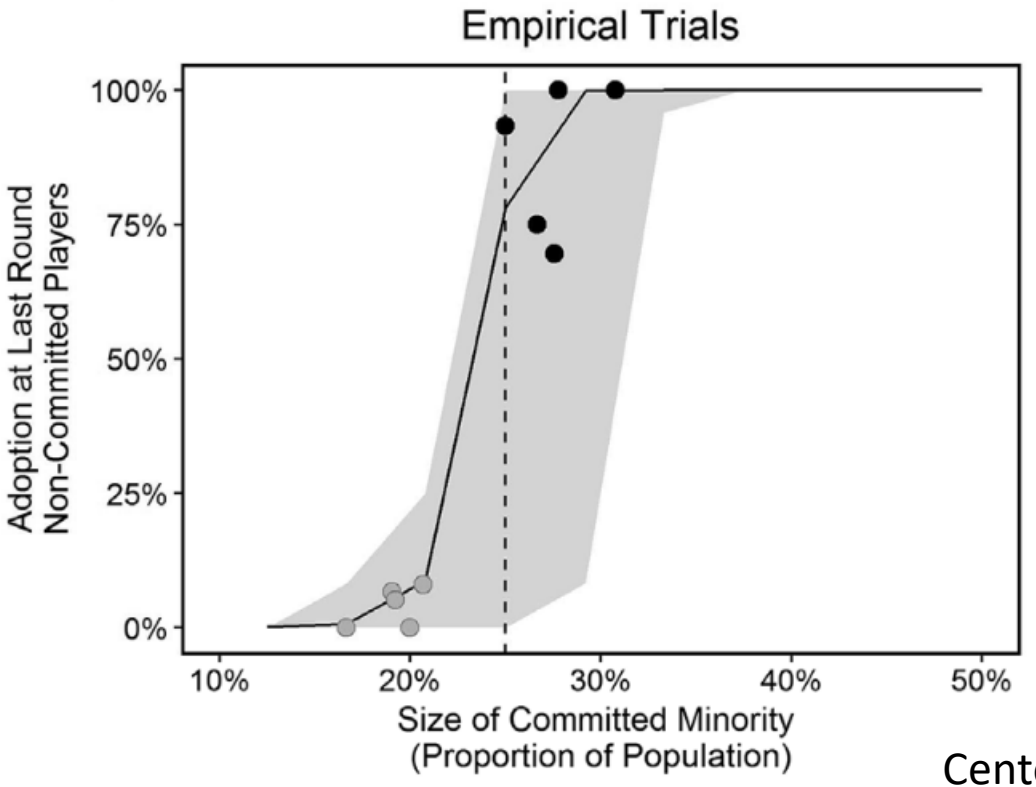
DIFFUSION OF INNOVATION

SOURCE: EVERETT ROGERS



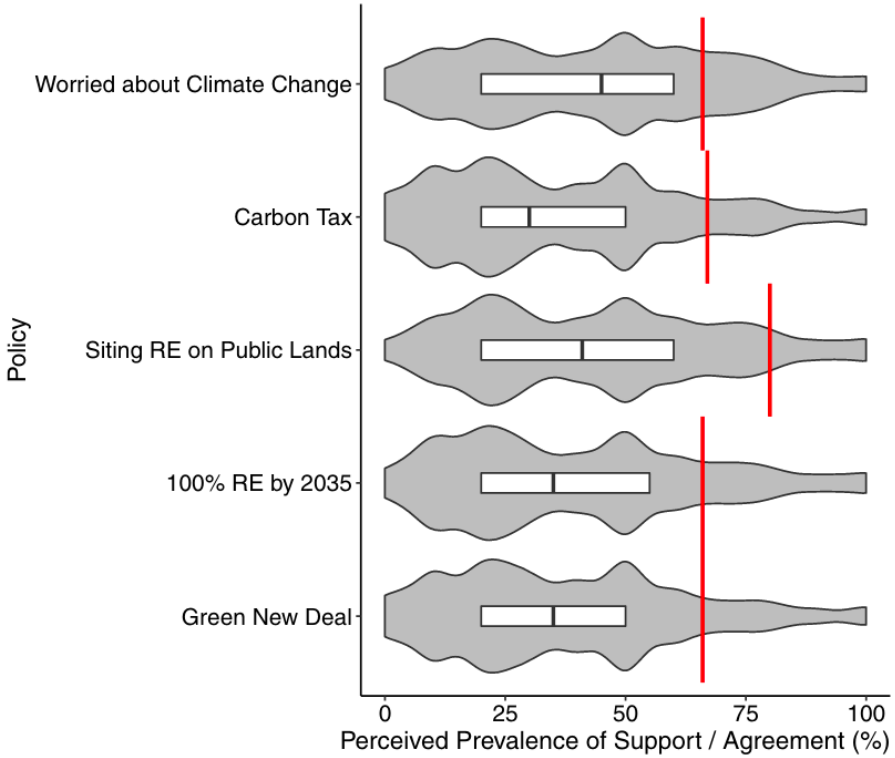
LEAD
50 models for success

Social tipping points



Centola et al. (2018) Science

False social reality



Sparkmann et al.
NatComm 2022

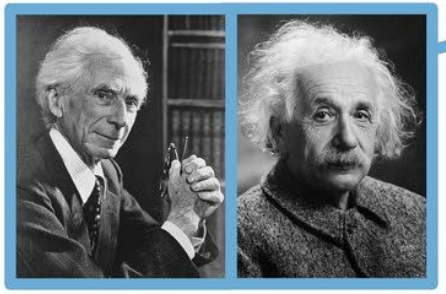
1860s - 1910s, England
Florence Nightingale (left) &
Elizabeth Garrett Anderson

1920s, Brazil
Biologists from
National Museum

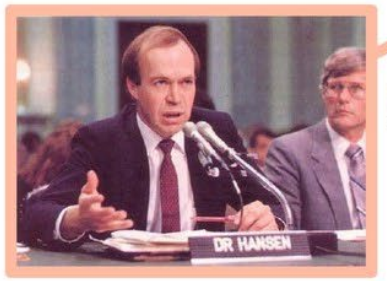
1960 - present, USA
Science for the People

2020s, Worldwide
Scientist Rebellion

1860 1890 1920 1950 1980 2010



1957, USA & Europe
Bertrand Russell (left) and
Albert Einstein



1988 - present, USA
James Hansen

2018 - present, Argentina
Esteban Servat

https://elifesciences.org/articles/83292

Academics as advocates and activists

Presenting the climate petition, signed by over 1,200 academics, students and alumni

Fossil ties (2023)

University budgets (2021)

Reproductive rights (2018)

Systems change in academia

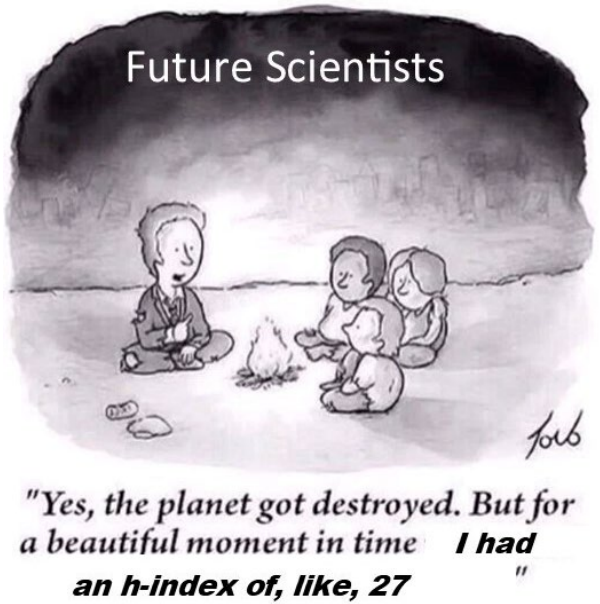
The case of open science

Systems change in academia

Why should we (as scientists) care & act?

We ….

- have seen big social changes happen (open science, diversity)
- understand data (exponential processes, feedback loops, homeostasis)
- know something about human behavior
- are (mostly) respected and sometimes influential
- teach the next generation
- work in large organizations, from where change can percolate
- have a moral obligation (especially those of us with tenure)



We can fix it.

Ok, where do I start?

Go to **wooclap.com** and use the code **NVPCLIMATE**

What actions do you take at the moment?

Click on the projected screen to start the question

wooclap

100 %

11

How Can Neuroscientists Respond to the Climate Emergency?

Adam R. Aron,[1,*] Richard B. Ivry,[2] Kate J. Jeffery,[3] Russell A. Poldrack,[4] Robert Schmidt,[5] Christopher Summerfield,[6,*] and Anne E. Urai[7]

https://doi.org/10.1016/j.neuron.2020.02.019

Climate crisis and ecological emergency: Why they concern (neuro)scientists, and what we can do

Brain and Neuroscience Advances
Volume 6: 1–11
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DOI: 10.1177/23982128221075430
journals.sagepub.com/home/bna
SAGE

Charlotte L. Rae[1], Martin Farley[2,3], Kate J. Jeffery[4] and Anne E. Urai[5]

https://doi.org/10.1177/23982128221075430

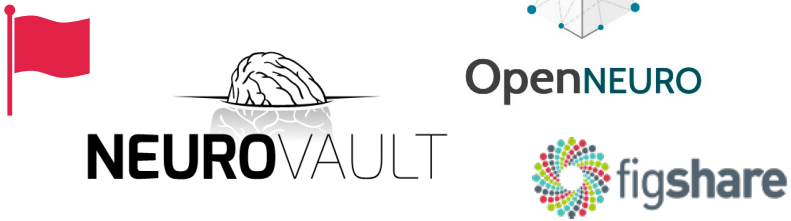
All materials and more resources at anneurai.net/green-neuroscience

What can *psychologists* do to help avert climate and ecological breakdown?

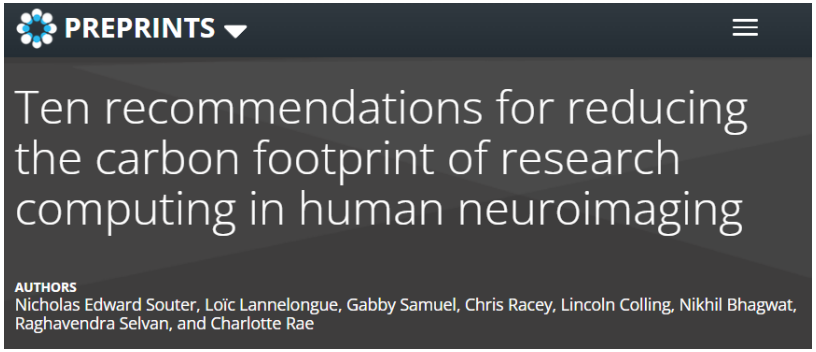
Rae, Farley, Jeffery, Urai (2022) BNA

Resource use & open science

- Google: 100% renewable



- Amazon Web Services
  - currently 50% renewable
  - non-renewable storage offset (highly problematic)



How I quit neuroscience to focus on preventing climate breakdown

Shifting fields takes courage, but if a tenured professor can't take the leap to address the ecological emergency, who can, asks Adam Aron

November 12, 2021

Adam Aron

Twitter: @swaziadam

Perspective

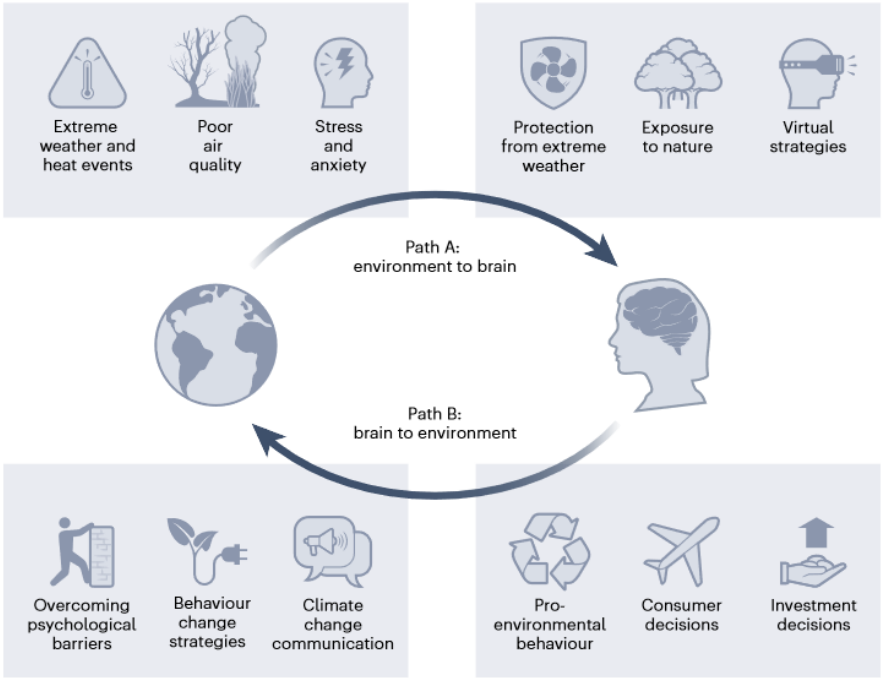
https://doi.org/10.1038/s41558-023-01857-4

Leveraging neuroscience for climate change research

Received: 27 February 2023

Accepted: 20 September 2023

Kimberly C. Doell[1,2,3,11], Marc G. Berman[4], Gregory N. Bratman[5], Brian Knutson[6], Simone Kühn[7], Claus Lamm[1,11], Sabine Pahl[1,11], Nik Sawe[8], Jay J. Van Bavel[3], Mathew P. White[9,10,11] & Tobias Brosch[2]



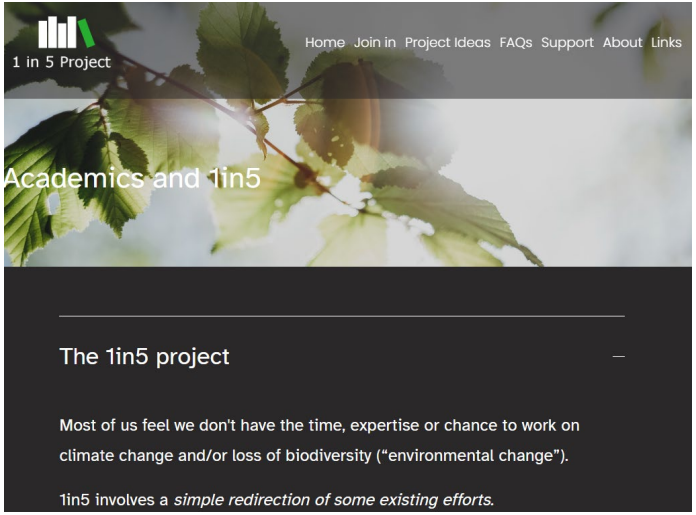
Addressing the Climate Crisis
An Action Plan for Psychologists

REPORT OF THE APA TASK FORCE ON CLIMATE CHANGE

10.1037/amp0001041

research actions

research beliefs

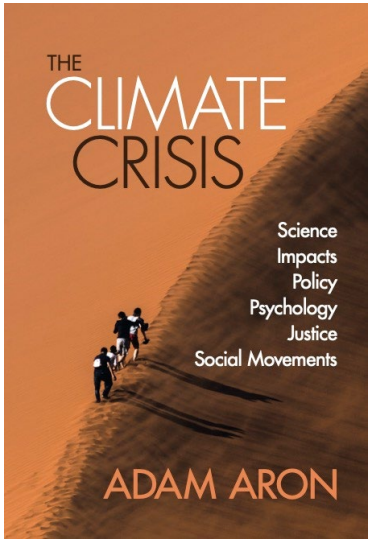


Teaching

- incorporate climate in your existing teaching

- teach a course on climate psychology

- *Skepticism, belief and misinformation*
- *Risk perception, heuristics and biases*
- *Mental health and climate anxiety*
- *Behavior change*
- *Collective action, group dynamics and social tipping points*



aronclimatecrisis.net

The Psychology of the Climate Crisis

AUTHOR
Psych 278 @Stanford

PUBLISHED
June 17, 2023

Preface

This is an open book created by the students and instructors in "The Psychology of the Climate Crisis", a course taught in 2023 in the Department of Psychology at Stanford University by Professors Noah Goodman and Russell Poldrack.

Institutional advocacy

Operations (food, transport, buildings, purchases)

Banks, insurance, finance (S4F)

Pension funds (ABP)

Ties to **fossil fuel industry**

Climate **education**

Scientific communities

OHBM Sustainability & Environmental Action
Special Interest Group

BNA Green Neuroscience Prize

The BNA has declared a climate emergency and is taking action in response to raise awareness within the neuroscience sector of the urgent need to minimise the negative environmental impact of undertaking research, teaching and practice.

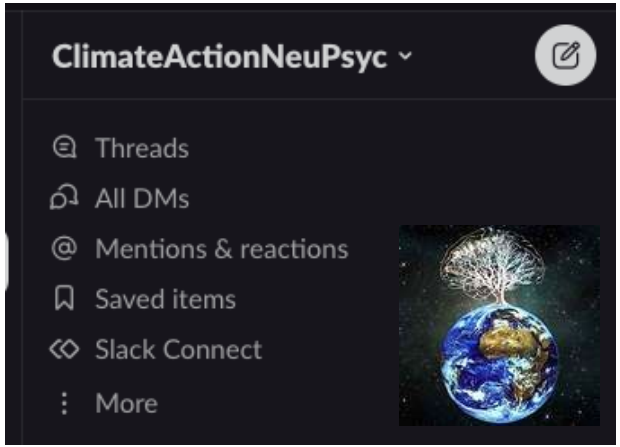
As part of this commitment, a new BNA prize is being launched in 2023 to recognise efforts in neuroscience aimed at reducing the environmental impact of research.

NVP 2025: green prize?

Whatever you do, don't do it alone

Scientists4Future NL

Coalitie van bezorgde wetenschappers



tinyurl.com/climate-action-neupsych

From belief to action

Putting things in practice

1. **Getting to know each other**
   - Groups of 5-8 people
   - How do you feel after this talk?
2. **Dreaming (5 minutes)**
   - Vision, goals and possibilities
     - *What would you like to see changed?*
3. **Planning (15 minutes)**
   - Identify actions
   - Position on impact vs difficulty axes
4. **Acting (5 minutes)**
   - Get started & find your community
   - Pledge: what will you do *this month*?

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What can *psychologists* do to help avert climate and ecological breakdown?

Rae, Farley, Jeffery, Urai (2022) BNA

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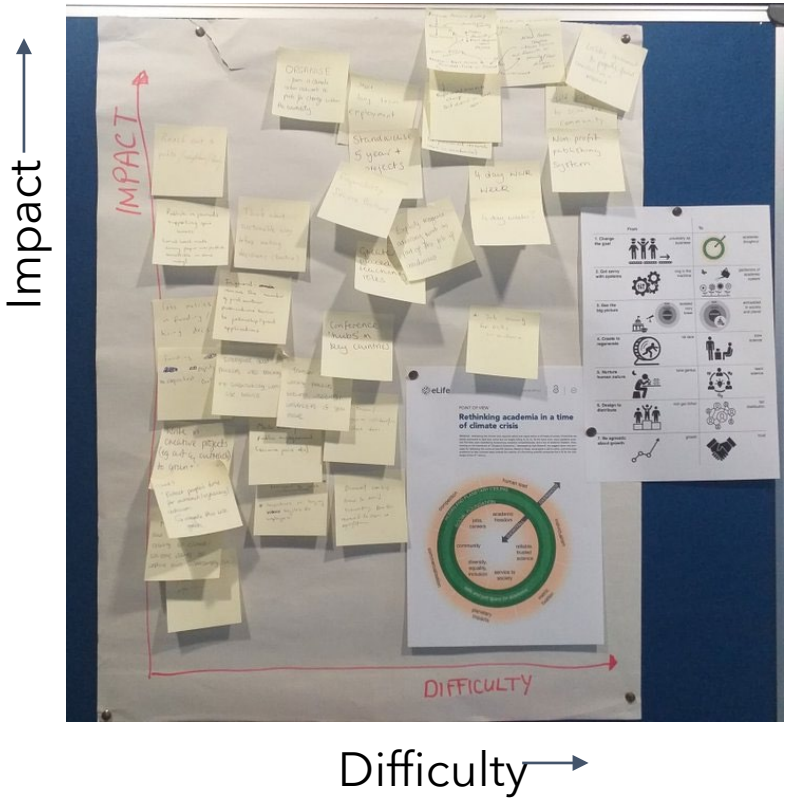
https://twitter.com/PerrinAbi/status/1663540134414008321



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   - Get started & find your community
   - Pledge: what will you do *in two months*?

tinyurl.com/green-neuroscience-feedback

Quick summary by each group

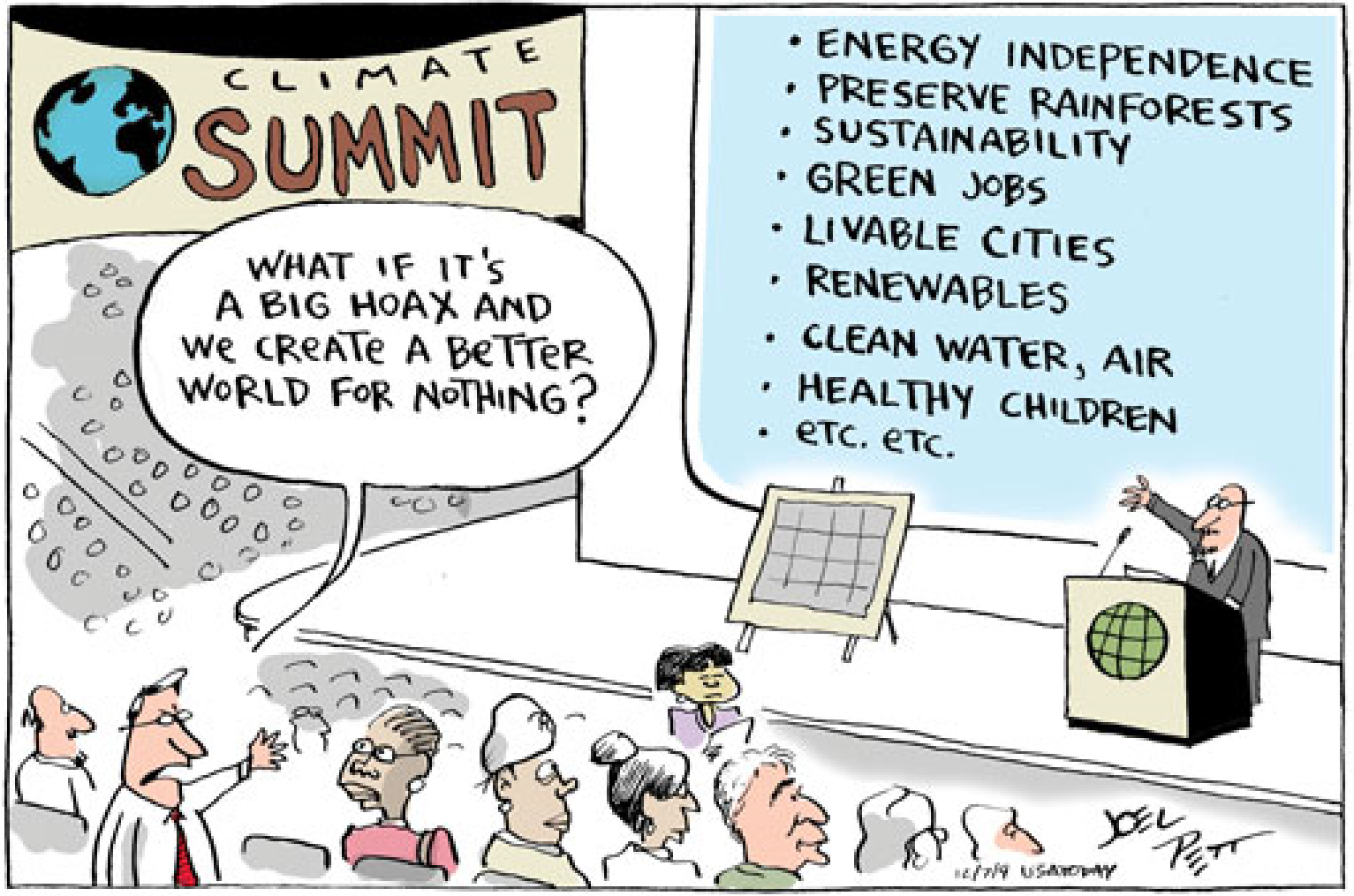
Don’t repeat previously mentioned pledges
Say 1 sentence!

tinyurl.com/green-neuroscience-feedback

THANK YOU!

a.e.urai@fsw.leidenuniv.nl

All materials and more at
anneurai.net/green-neuroscience


CLIMATE
SUMMIT
WHAT IF IT'S A BIG HOAX AND WE CREATE A BETTER WORLD FOR NOTHING?
• ENERGY INDEPENDENCE
• PRESERVE RAINFORESTS
• SUSTAINABILITY
• GREEN JOBS
• LIVABLE CITIES
• RENEWABLES
• CLEAN WATER, AIR
• HEALTHY CHILDREN
• ETC. ETC.
JOEL PETT