

Public Understanding of Climate Change Terms: Key Findings

AUTHORS

Wändi Bruine de Bruin

Lila Rabinovich

Kate Weber

Marianna Babboni

Monica Dean

Lance Igonon

March 1, 2021



Acknowledgements

This research was supported by the University of Southern California Dornsife College Public Exchange. Wändi Bruine de Bruin was additionally supported by the Center for Climate and Energy Decision Making through a cooperative agreement between the National Science Foundation and Carnegie Mellon University. This study was conducted in coordination with the United Nations Foundation and with the help of the Intergovernmental Panel on Climate Change Working Group co-chairs and communication officers. We are grateful for their expert advice. We would also like to acknowledge USC Dornsife's Center for Economic and Social Research, with a special thanks to Marwa Mohammed for her reliability coding and Tania Gutsche for her help recruiting participants.

Disclaimer

The views expressed herein are those of the authors and not necessarily those of the United Nations Foundation, the USC Dornsife College of Letters, Arts and Sciences, or the University of Southern California as a whole.

For more information,
contact: publicexchange@usc.edu

Public Understanding of Climate Change Terms: Key Findings

The science of climate change is well understood. How to best communicate it is not.

The words climate scientists use to share their insights may be too complex. This is the main finding of a new study by the University of Southern California and the United Nations Foundation. The team found that people in the U.S. struggle with some of the most widely used words and phrases used to describe climate change.

The team asked people to read terms and phrases from reports by the Intergovernmental Panel on Climate Change (IPCC).

The team found that:

1. People thought many of the terms were too complex;
2. When people recognized the terms, they often defined them in ways that had nothing to do with climate change;
3. Participants thought crucial details were missing (e.g. *carbon dioxide removal*); and
4. Seeing the terms as part of text from IPCC reports was not always helpful.

These suggestions may help to improve public understanding of climate change reports.

1. Avoid technical language (i.e. jargon), and use shorter words.
2. Make the link to climate change clear.
3. Include key details.
4. Use short sentences.

“It sounds like you’re talking over people. When I see this stuff on TV, and you see these talking heads on Nova and whatnot. They’re talking way over people’s heads.” — Interviewee

The Case for Simpler Language

Reading skills vary widely among the public. Many adults in the U.S., Canada, U.K and Europe read at the level of 12- or 13-year-olds (Daraz et al. 2011; Davis et al. 1996; Neuhauser and Paul 2011; OECD 2013; Paashe-Orlow et al. 2003). Sentences of 16-20 words and words with no more than two syllables are easier to read (Cutts 2013; Kadayat and Eika 2020; McLaughlin 1969).

Text meant for the public should be written at the level of a reader who is 12 or 13 years old (Wong-Parodi et al. 2013). Simple text should also help policymakers who are not experts in climate science (Wong-Parodi et al. 2013). Yet, IPCC reports for policymakers have been written at the university level (Barkemeyer et al. 2015).

Experts often want to use complex words to share their insights (Wong-Parodi and Strauss 2014). But complex topics can be explained in simple words (Morgan et al. 2002). The study lead, Wändi Bruine de Bruin, has shown how to make text about climate change easier to read (Bruine de Bruin and Morgan 2019; Fleishman-Mayer and Bruine de Bruin 2014). This report is written at the level of a 12-year-old. You can check the readability score of your text in [Microsoft Word](#).

Survey Design

As part of the study, 20 people read terms and phrases about climate change. They also rated how hard or easy the terms were to understand. Ratings could range from 1 to 5. The number 1 meant “not easy at all.” The number 5 meant “very easy.”

A sample of 20 is large enough to find terms that are likely to be misunderstood (Morgan et al. 2002). In our study, 88% of the misunderstandings were raised in the first 10 interviews. No new ones were raised after 17 interviews.

Participants were drawn from a national sample. They were part of the University of Southern California’s Understanding America Study (UAS). Participants varied in their climate change views. Of the participants, three were Hispanic, two mixed-race, one African-American, and one Asian. Ten were men. Ten were younger than 38 (age range 19-74). Five did not have a college degree.

Findings

Mitigation, *carbon neutral* and *unprecedented transition* were seen as the harder terms to understand. But none of the terms were seen as *very hard* to understand. *Sustainable development*, *carbon dioxide removal*, *tipping point*, *adaptation*, and *abrupt change* were seen as the easier terms.

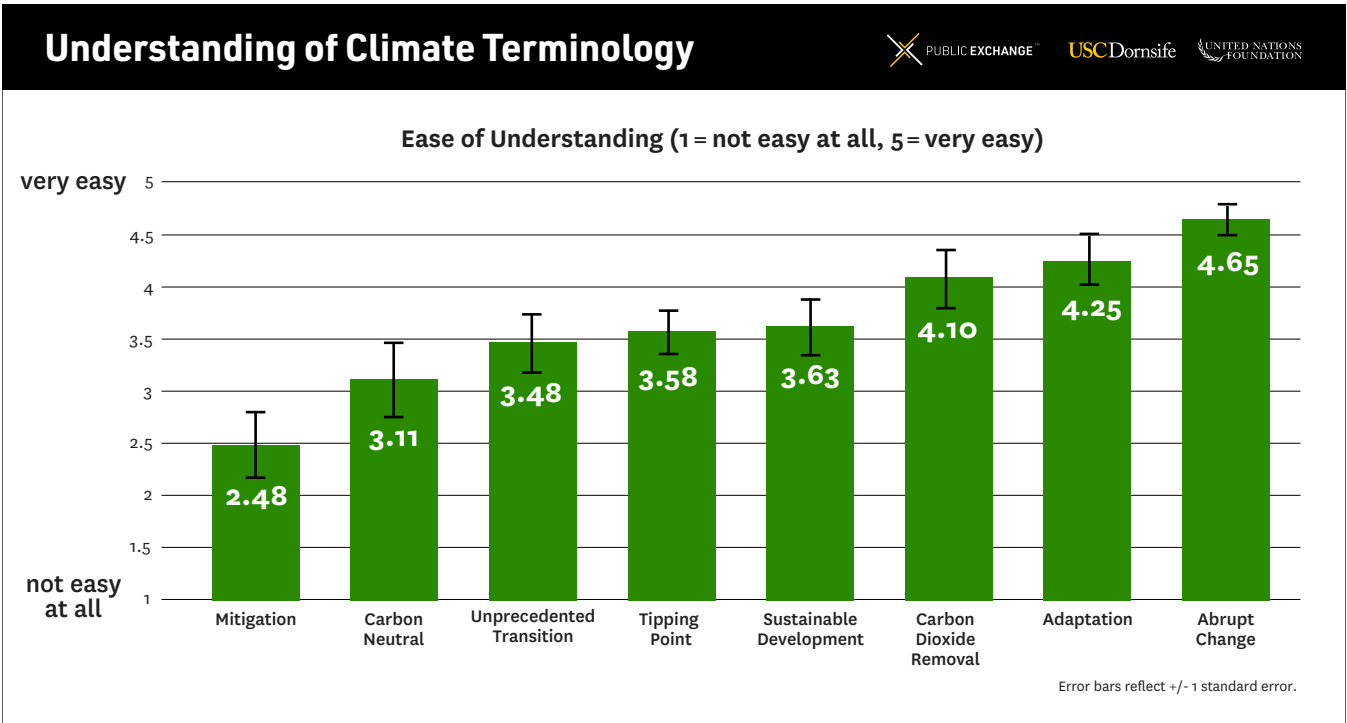


Table 1

Terms that were hardest to understand on their own were easier to understand when they were included in a sentence. But terms that were easiest to understand on their own were harder to understand when they were included in a sentence. This is likely due to the sentences being long and wordy.

Table 1			
Term	Ease of understanding, as rated by participants (1 = not easy at all; 5 = very easy)	Sentence	Ease of understanding, as rated by participants (1 = not easy at all; 5 = very easy)
Mitigation	2.48	Despite a growing number of mitigation policies, annual emissions continued to increase.	3.80
Carbon neutral	3.11	To become carbon neutral around 2050, global carbon emissions would need to fall 45% by 2030.	3.75
Unprecedented transition	3.48	Limiting global warming to 1.5c is not impossible, but would require unprecedented transitions in all aspects of society.	3.49
Tipping point	3.58	The precise levels of climate change sufficient to trigger tipping points remain uncertain.	2.90
Sustainable development	3.63	Natural hazards, climate change, and societal vulnerability can pose fundamental limits to sustainable development.	3.08
Carbon dioxide removal	4.10	Carbon dioxide removal can be used to compensate for unavoidable emissions.	3.78
Adaptation	4.25	Without major investments in adaptation, island nations would be exposed to escalating flood risks.	3.63
Abrupt change	4.65	A continued rise in global emissions increases the likelihood of abrupt changes in ocean circulation in the coming centuries.	4.05

Table 2

Even when people recognized the terms, they often did not see a link to climate change. For example, Table 2 shows that no one expressed confusion about adaptation. Yet, some thought of it as adapting a book into a movie. Others thought it involved no conscious decisions. As one put it: “Everybody has to adapt at some time in your life, whether it’s weather, a job, you know, children, a new relationship?” Another person described abrupt change as “you can make an abrupt change to change what nature is already doing.” These examples suggest that it is key to avoid jargon and use simple words to describe climate change.

Table 2 also shows how people thought terms could be simplified. In the end, which words and terms to use will be up to climate scientists and their colleagues.

Table 2

Terms	Select Findings	Quotes from Interviewees	Suggestions
Mitigation	7 of 20 participants did not know how to describe <i>mitigation</i>. <i>Mitigation</i> was confused with <i>mediation</i>.	“Say you were having an argument with someone, and you have someone come in, a third party, to mitigate or go between.” “To me personally it means mitigating costs, keeping costs low. [...] To prevent the expenditure of filing a lawsuit.”	Use simple wording and add climate risks. Refer to specific climate change actions or climate change policies. “To stop climate change (from getting worse).”
Carbon neutral	9 of 20 realized that <i>carbon neutral</i> meant not increasing carbon dioxide levels. 5 of 20 said they did not know what to say, especially about the term <i>carbon</i>. The term <i>neutral</i> was confused with zero emissions, and carbon as neither good nor bad for the environment. The process of getting to a <i>carbon neutral</i> state was unclear.	“I learned in school about how they can do carbon dating; I don’t know that carbon neutral doesn’t have something to do with it.” “I thought I understood it but the more that I read it I kind of do not understand this one.” “It’s something that doesn’t increase or decrease the amount of carbon dioxide that is released into the air.”	Avoid confusion with zero carbon, spell out carbon dioxide. Describe the process. “No net increases in carbon dioxide in the air.” “To balance out or compensate for carbon dioxide we put in the air.”
Unprecedented transition	13 of 20 said that <i>transition</i> meant “change,” and 2 said it meant “movement.” 8 of 20 mistook <i>unprecedented</i> to mean “unexpected” or “unknown.”	“I feel like unprecedented is kind of a big word. [But] transition, I think that seems like an easy word.” “Limiting the increase in global temperatures would require us to make changes that we’ve not had to do before.”	Use simple wording referring to context of climate change action. Provide examples. “Making big changes together to stop climate change.”
Tipping point	12 in 20 mentioned the tipping of a balance, and 8 referred to difficulties in changing back. Yet, the link to climate change was often not made. While the term <i>tipping point</i> was rated as quite easy, 3 in 20 said they did not know it.	“It means that there’s a range of where things will balance themselves out and the tipping point would be where you move past that balance point and it’s the danger zone.” “A tipping point is almost like someone’s breaking point to where they reach a limit of something they can endure.” “The point when there is no longer a way for us to reverse the course of action that has led to climate change.”	Use simple wording and add climate context. “Point at which we can no longer undo climate change.” “When it is too late to fix damage from climate change.” “Point of no return.” “Too late to fix anything.”

Table 2 (Continued)

Terms	Select Findings	Quotes from Interviewees	Suggestions
Sustainable development	13 in 20 referred to housing and infrastructure when describing <i>sustainable development</i>. 2 in 20 did not know how to describe <i>sustainable development</i>. 4 in 20 thought of “a renewable resource.” 4 in 20 said it means “it’s self-sufficient.”	“If you’re putting these two words together, it’s saying that something is growing. But, it’s growing in a stable manner.” “It’s a pretty popular term to try to be sustainable but it is a little bit opaque as to what sustainability means in each different context.” “... new buildings, whether it be homes or businesses, being built in such a way that it is environmentally sustainable.”	Use simple wording and add climate context. “Environmentally friendly policies to ...” “Environmentally friendly growth in ...” “Controlled growth.” Provide “just a little bit more information about what sustainable development means as a goal and as a target.”
Carbon dioxide removal	13 in 20 recognized that the term referred to removing carbon dioxide from “somewhere” like the atmosphere, air, manufacturing or emissions. 2 in 20 did not know how to describe <i>carbon dioxide removal</i>. 7 in 20 were confused about the process of <i>carbon dioxide removal</i>.	“I know they want to remove carbon dioxide, obviously, but ... I didn’t know how the process is done. Some cleaning? I don’t know.” “The sentence is saying that we know that there’s gonna be emissions of some sort that will have carbon dioxide emitted, and for those scenarios, there’s ways that we can remove that emitted carbon dioxide. I would not have guessed technological by itself. I would’ve assumed the simple natural way of a tree, at first.” “Removal from what?”	Specify source, process and emissions. Consider using CO₂ instead of carbon dioxide. “Taking carbon dioxide out of the air by planting trees and filtering exhaust.” “Taking CO₂ out of the air.” “Removing CO₂ from the air.”
Adaptation	None expressed uncertainty about this term. The process of adaptation was often not seen as resulting from conscious decisions, and was defined as a natural part of life and evolution. 2 in 20 referred to <i>adaptation</i> in the context of “books that are made into movies.”	“Just say you’ll need to adjust. I hate to say adapt.” “In evolutionary context it means to change over time to suit your environment.” “You need to adapt to your living situation. If you’re very wealthy [and] you lose everything and you have to live in an old trailer somewhere in the hills you have to learn to adapt.” “Everybody has to adapt at some time in your life, whether it’s weather, a job, you know, children, a new relationship?”	Use simple wording, link to climate change action, clarify strategy. “Make changes to survive climate change, such as ...” “To protect against climate change, by doing ...”
Abrupt change	18 in 20 referred to a quick or sudden change. While the words seemed familiar, their combination or use in the climate context were not. Only one described it in the context of climate and weather.	“I know what the word abrupt means, and I obviously know what changes means. So, whatever context it was it was probably about I guess sudden and unexpected change [but] the term abrupt is kind of maybe not as widespread as the term change.” “[In Hawaii] it would go from being a nice, calm day to all of the sudden, you know, storms and thunder and lightning, you know, thunder and rain, you know? It would just be crazy. And then abrupt change, if you do something to – you can make an abrupt change to change what nature is already doing.”	Change “abrupt” to fast or quick to indicate speed of change, or dramatic or serious to indicate size of change. Explain how change is faster than it otherwise would have been without human activities. “Sudden change.” “A very serious change in a very short time.” “Change abrupt to quick or fast.”

Table 2 Note: Interviews are used to find out which issues occur. Follow-up surveys are needed to assess how often they occur. The percent of interviewees raising each issue should be interpreted with caution.

Study Team

Wändi Bruine de Bruin is a professor at USC. She works at the [USC Price School of Public Policy](#) and the [Department of Psychology](#) at the [USC Dornsife College of Letters, Arts and Sciences](#). She has helped the United Kingdom's Met Office find out how policy makers interpret climate graphs. Her team's [findings](#) informed the redesign of those graphs.

Lila Rabinovich did the interviews and led the initial analysis. She is a researcher at the [USC Dornsife Center for Economic and Social Research](#).

Kate Weber and **Marianna Babonni** of the [Public Exchange](#) at USC Dornsife coordinated the project. They work with public and private sectors to define, analyze and solve complex problems together.

Lance Ignon gave advice on how to communicate our findings better. He is USC Dornsife's Senior Associate Dean of Strategic Initiatives and Communication. He worked as a communication consultant for the United Nations Foundation and the IPCC.

Monica Dean works at the [United Nations Foundation](#). She is the Senior Manager for Energy, Climate, and Environment. She leads communications work in support of the IPCC.

The full report can be read in the *Climatic Change Journal*.

For more information, please contact publicexchange@usc.edu.