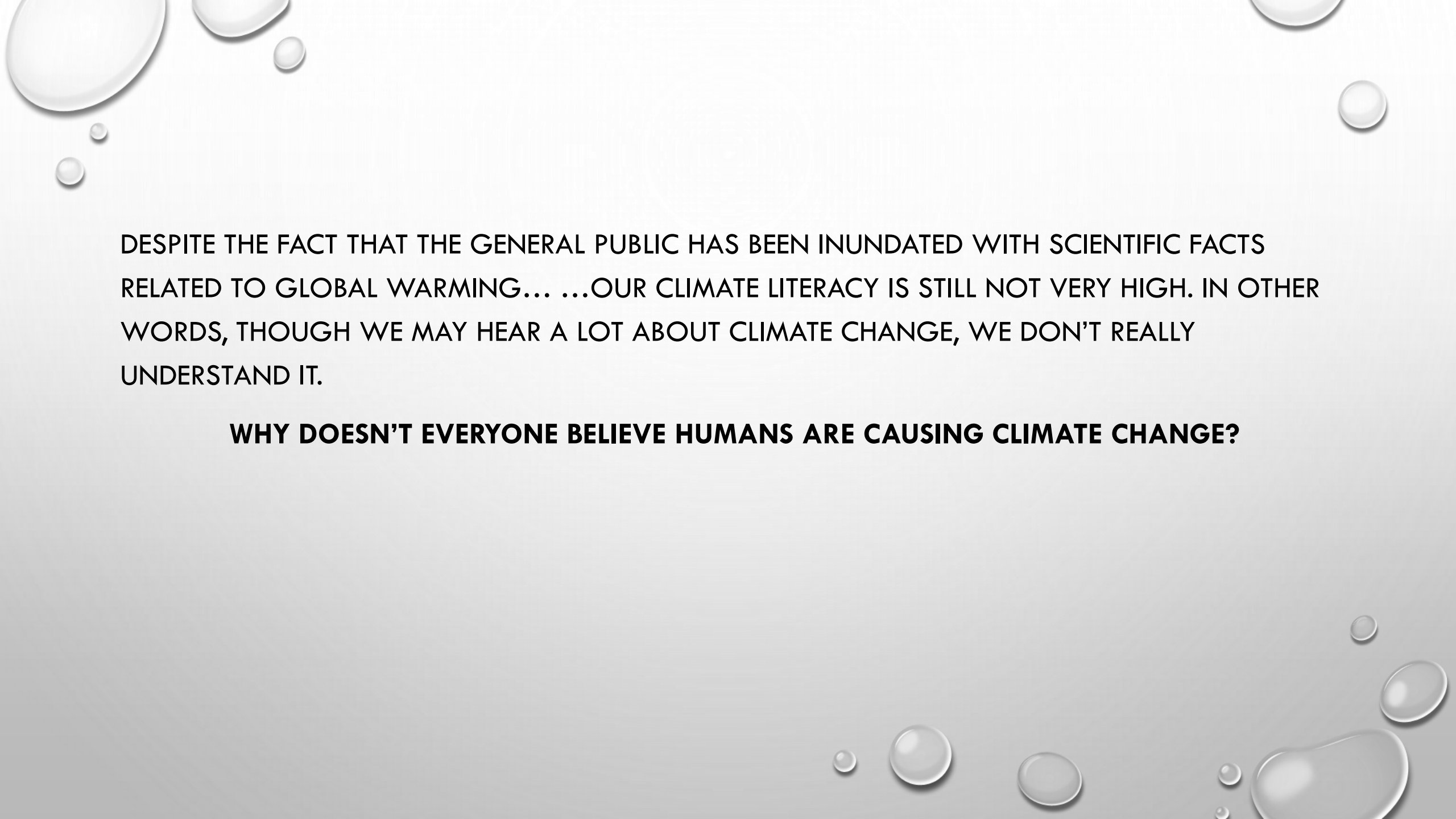


The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. The main title is centered in a large, bold, black, sans-serif font.

TEACHING CLIMATE CHANGE POLICY WITH A LITTLE NUMBER CRUNCHING

A PRESENTATION AT THE WEBSTER UNIVERSITY 2018 TEACHING FESTIVAL

BY JOHN ALESHUNAS



DESPITE THE FACT THAT THE GENERAL PUBLIC HAS BEEN INUNDATED WITH SCIENTIFIC FACTS RELATED TO GLOBAL WARMING... ..OUR CLIMATE LITERACY IS STILL NOT VERY HIGH. IN OTHER WORDS, THOUGH WE MAY HEAR A LOT ABOUT CLIMATE CHANGE, WE DON'T REALLY UNDERSTAND IT.

WHY DOESN'T EVERYONE BELIEVE HUMANS ARE CAUSING CLIMATE CHANGE?




OUTLINE

- PRESENTATION CONTEXT
 - THE CLIMATE CONTROVERSY
 - FACTS NOT BELIEFS
 - ACCESSIBLE DATA, ACCESSIBLE TOOLS
 - TEST DRIVE
 - APPLICATION
 - SUMMARY
- 



PRESENTATION CONTEXT

- DISCLAIMER: MY AREA OF EXPERTISE IS NOT CLIMATE SCIENCE
 - THIS IS A DEMONSTRATION OF HOW DATA ANALYSIS CAN ENHANCE THE LEARNING EXPERIENCE
 - CURRENT TOOLS AND RESOURCES CAN EASILY FACILITATE THIS PROCESS
- 



THE CLIMATE CONTROVERSY

THE CATALYST

TWENTY YEARS AGO, POLAR BEARS MADE PEOPLE THINK OF COCA-COLA. TEN YEARS AGO, THE BRUINS BECAME THE FACE OF CLIMATE CHANGE BECAUSE THEIR MELTING ARCTIC ICE HABITAT PERFECTLY CAPTURED THE DANGERS OF A WARMING WORLD. MORE RECENTLY, AS A DIRECT RESULT OF THE BEARS' ENVIRONMENTAL POSTER CHILD STATUS, SCIENCE DENIERS HAVE BEGUN USING THEM IN ATTEMPTS TO TURN THE ARGUMENT FOR CLIMATE SCIENCE ON ITS HEAD. BUT NOW, THERE'S NO WAY TO TALK ABOUT POLAR BEARS WITHOUT TALKING ABOUT ONE PARTICULAR VIRAL VIDEO.

THE POLAR BEAR, CLIMATE CHANGE'S POSTER CHILD, IGNITES CONTROVERSY





THE CLIMATE CONTROVERSY

A COMMENT

BUT... FOR THIS INDIVIDUAL BEAR, THERE'S NO WAY TO KNOW EXACTLY WHAT'S CAUSING THAT STARVATION. THE FACTORS COULD RANGE FROM OLD AGE OR INJURY TO DISEASE OR SOME OTHER UNSEEN COMPLICATION THAT HAS PREVENTED THE BEAR FROM CATCHING PREY.

GEOFF YORK, SENIOR DIRECTOR OF CONSERVATION AT POLAR BEARS INTERNATIONAL

THE POLAR BEAR, CLIMATE CHANGE'S POSTER CHILD, IGNITES CONTROVERSY



THE CLIMATE CONTROVERSY

THE COMPLEXITY

CLIMATE CHANGE IS AN ENORMOUS, COMPLEX PROBLEM THAT WILL AFFECT THE GLOBE IN DIFFERENT WAYS. AND WHILE WE HAVE TONS OF DATA THAT SUGGEST A WARMER ARCTIC WILL BE TERRIBLE, HORRIBLE, NO GOOD, VERY BAD NEWS FOR POLAR BEARS, THIS ONE ANECDOTAL ACCOUNT OF A STARVING BEAR IS JUST THAT, ANECDOTAL. AND WHEN YOU PIN A SINGLE BEAR TO A PHENOMENON BEST UNDERSTOOD BY ANALYZING DECADES OF CLIMATE, SEA ICE, AND POPULATION DATA, WELL, YOU PAINT A PRETTY BIG TARGET FOR SCIENCE DENIERS TO ATTACK.

THE POLAR BEAR, CLIMATE CHANGE'S POSTER CHILD, IGNITES CONTROVERSY

THE CLIMATE CONTROVERSY

COMPLICATIONS

CLIMATE ILLITERACY ISN'T JUST LIMITED TO THE GENERAL PUBLIC, EITHER. RANNEY RECALLS A SCIENTIST'S PRESENTATION AT A RECENT CONFERENCE WHICH SAID THAT MANY UNIVERSITY PROFESSORS TEACHING GLOBAL WARMING BARELY HAD A BETTER UNDERSTANDING OF ITS MECHANISM THAN THE UNDERGRADUATES THEY WERE TEACHING. "EVEN ONE OF THE MOST HIGHLY-CITED CLIMATE CHANGE COMMUNICATORS IN THE WORLD DIDN'T KNOW THE MECHANISM OVER DINNER," HE SAYS.

MICHAEL RANNEY, PROFESSOR OF EDUCATION AT THE UNIVERSITY OF CALIFORNIA, BERKELEY

WHY DOESN'T EVERYONE BELIEVE HUMANS ARE CAUSING CLIMATE CHANGE?

FACTS NOT BELIEFS

WE LIVE IN AN AGE WHERE VAST AMOUNTS OF INFORMATION CAN BE ACCESSED ON THE INTERNET. MUCH OF THIS INFORMATION IS QUANTITATIVE IN NATURE AND STUDENTS (AND ADULTS) MUST BE EQUIPPED TO ANALYZE THE INFORMATION AS THEY SIFT THROUGH THE DATA TO MAKE DECISIONS IN THEIR EVERYDAY LIVES. AND, AS “BIG DATA” ANALYSES MOVE FROM PURE RESEARCH APPLICATIONS TO BUSINESS, EDUCATION, HEALTH, AND GOVERNMENT SETTINGS WHERE OUR GRADUATES WILL BE WORKING, THIS IMPERATIVE BECOMES MORE CRITICAL. EVEN IN OUR OWN INSTITUTIONS OF HIGHER EDUCATION, WE ARE CRUNCHING LARGE DATA SETS OF STUDENT INFORMATION TO MONITOR AND PREDICT STUDENT PERFORMANCE AND SUCCESS. ALL OF THESE SITUATIONS REQUIRE STRONG QUANTITATIVE REASONING SKILLS.

SUSAN ELROD, *THE NEXT "ACROSS THE CURRICULUM"* MOVEMENT IN THE AAC&U PEERREVIEW

FACTS NOT BELIEFS

- DATA ANALYSIS CAN ADD CONTEXT TO POLICY DISCUSSION
- DATA ANALYSIS CAN DESCRIBE COMPLEXITY ISSUES
- DATA ANALYSIS CAN INDICATE ADDITIONAL RESEARCH PROJECTS

- THIS PRESENTATION FOCUSES ON QUANTITATIVE VERSUS QUALITATIVE RESULTS



ACCESSIBLE DATA, ACCESSIBLE TOOLS

- EASILY ACCESSIBLE, ONLINE CLIMATE DATA REPOSITORIES
 - FREE, POWERFUL ANALYTICAL TOOLS
- 

CLIMATE DATA RESOURCES

- **CLIMATE DATA ONLINE**

[HTTPS://WWW.NCDC.NOAA.GOV/CDO-WEB/](https://www.ncdc.noaa.gov/cdo-web/)

- **WORLD BANK CLIMATE DATA**

[HTTPS://ROPENSCI.ORG/USECASES/RWBCLIMATE_INTRO/](https://ropensci.org/usecases/rwbclimate-intro/)

- **US CLIMATE DATA**

[HTTPS://WWW.USCLIMATEDATA.COM/](https://www.usclimatedata.com/)

- **DATA.GOV**

[HTTPS://WWW.DATA.GOV/CLIMATE/](https://www.data.gov/climate/)

WHY USE R?



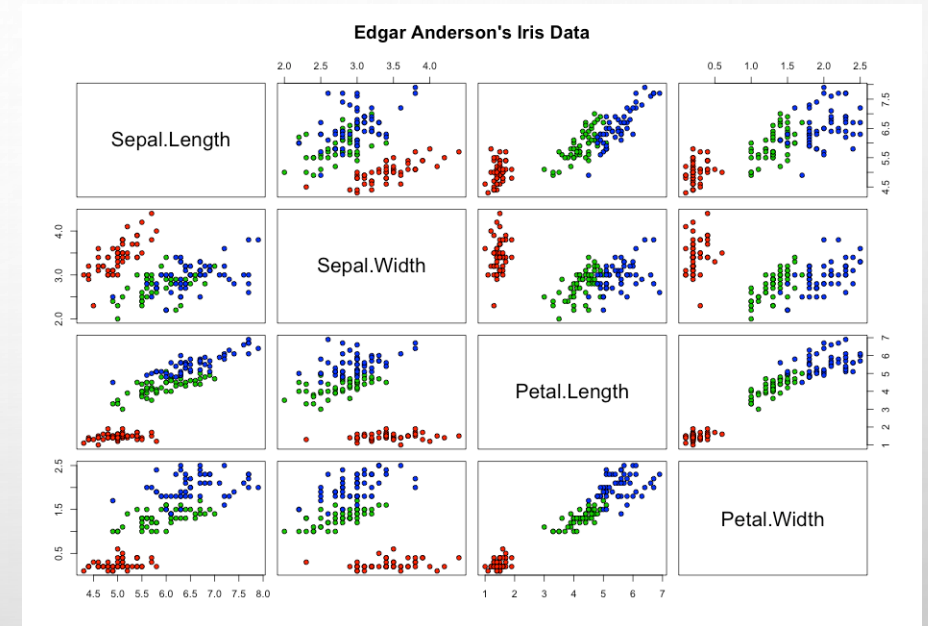
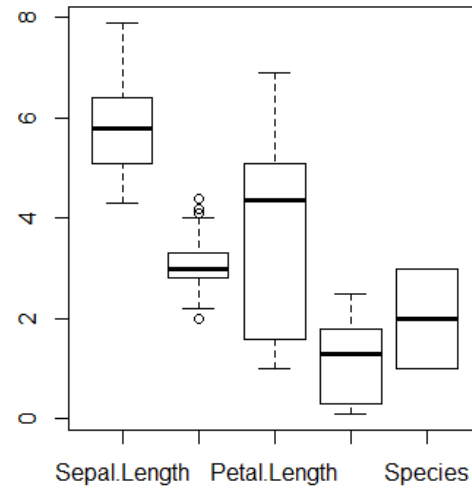
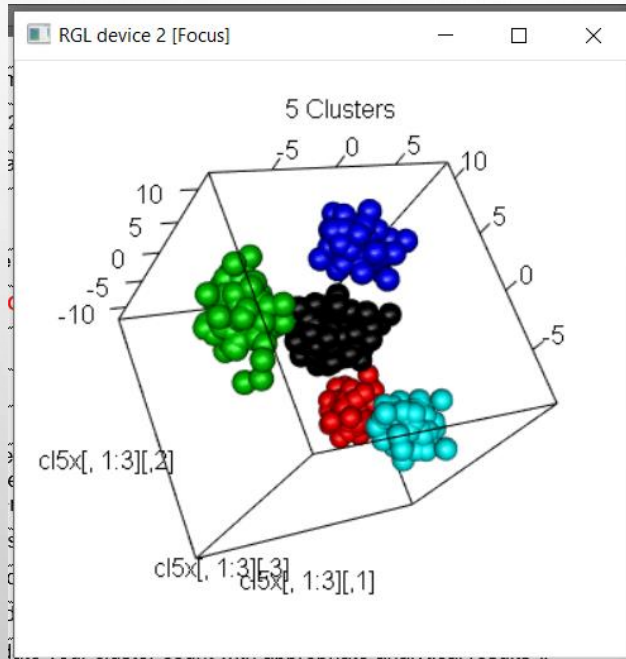
- R IS OPEN SOURCE AND FREE



R CROSS-PLATFORM ENVIRONMENT



R GRAPHICS AND VISUALIZATION



TEST DRIVE

- AN EXAMPLE SESSION
 - WORLD BANK CLIMATE DATA
 - COMPARISON OF TEMPERATURE AND PRECIPITATION CLIMATE MODELS
 - TEMPERATURE TREND ANALYSIS
 - POTENTIAL FOLLOW-ON RESEARCH PROJECT

APPLICATION

- SUPPORT FOR KEYS 4014 SOCIAL MOVEMENTS AND SOCIAL MEDIA
 - SUPPORT FOR FALL SECTION
 - TRAINED COURSE LEAD TO RUN QUERIES
- SUPPORT FOR BIOLOGY SENIOR THESIS ANALYSIS
 - MACHINE LEARNING METHOD TO CLASSIFY ANIMAL SKULLS



SUMMARY

- PRESENTATION CONTEXT
 - THE CLIMATE CONTROVERSY
 - FACTS NOT BELIEFS
 - ACCESSIBLE DATA, ACCESSIBLE TOOLS
 - TEST DRIVE
 - APPLICATION
 - SUMMARY
- 

REFERENCES

- **WHY DOESN'T EVERYONE BELIEVE HUMANS ARE CAUSING CLIMATE CHANGE?**
[HTTP://WWW.PBS.ORG/WGBH/NOVA/NEXT/EARTH/CLIMATE-CHANGE-ACCEPTANCE/](http://www.pbs.org/wgbh/nova/next/earth/climate-change-acceptance/)
- **THE POLAR BEAR, CLIMATE CHANGE'S POSTER CHILD, IGNITES CONTROVERSY**
[HTTPS://WWW.NRDC.ORG/ONEARTH/POLAR-BEAR-CLIMATE-CHANGES-POSTER-CHILD-IGNITES-CONTROVERSY](https://www.nrdc.org/onearth/polar-bear-climate-changes-poster-child-ignites-controversy)