

Supplementary Materials for
Party Elites or Manufactured Doubt?
The Informational Context of Climate Change Polarization

Sample Construction and Dictionaries

We downloaded transcripts and articles if they had reference to either global warming or climate change in both the body of the text and *Lexis*'s or *Factiva*'s subject tags. They were further limited to those that had a geography tag indicating that the story contains some focus on the United States. Unfortunately, the subject tags are error prone, so we used a combination of manual coding and machine learning to ensure the sample only included relevant articles and transcripts

We manually coded the sample of broadcast transcripts identified as having Republican and Democratic cues for relevance. We also coded a sample of 500 articles each from three time periods: 1980-1997, 1998-2005, and 2006-2014. Coders marked a story as relevant if a segment of the transcript or article was about climate science, climate change impacts, or policy aimed at addressing climate change. This excluded articles that made only passing references to climate change. We then used *R Text Tools*, an R package that assembles nine machine learning algorithms, to code the remaining articles for relevance. Algorithms were trained on each time period sample independently, and applied to the remaining articles for a given period. In doing so, we hoped to maintain algorithm accuracy over time as the salience of climate change and the nature of its coverage changed over time. Agreement on topic relevance between the machine results and manual coding for validation was approximately 90 percent for newspapers across all three time periods, and between 84 and 96 percent for broadcast transcripts that lacked the presence of party cues. Articles with party cues had irrelevant transcripts purged manually. The procedure overall significantly improved the quality of our sample.

Our dictionary of party elites include generic references to political parties, political titles, and the names of prominent members of each party's leadership. This includes presidents, vice presidents,

presidential nominees, speakers of the House, and House and Senate majority and minority leaders. We chose party leadership as a simple decision rule in developing the dictionary because it covers those most likely to attract media attention and who may not often have their party name referenced in the text due to their prominence. Figures of lesser stature tend to have their party identified in the text, and this would be picked up by our dictionary. There was one exception. State governors sometimes did not have their party identified in the text of an article. However, coverage of state governors was limited in largely national coverage of climate change, and references to governors and other state officials are picked up in our generic politician dictionary that is used in Figure 1. We believe our dictionary to be comprehensive enough for our purposes where one reference is sufficient to classify an article as having a party cue included.

(R-	GOP	republican
Bill Frist	Howard Baker	Ronald Reagan
Bob Dole	John Boehner	Speaker Boehner
Bob Michel	John McCain	Speaker Gingrich
Dan Quayle	John Rhodes	Speaker Hastert
Dennis Hastert	Mitch McConnell	Trent Lott
Dick Cheney	Mitt Romney	Vice President Bush
G.O.P.	Newt Gingrich	Vice President Cheney
George Bush	President Bush	Vice President Quayle
George H.W. Bush	President Reagan	
George W. Bush	Republican	

Table A1. Republican party dictionary. Lists the keywords and phrases we searched for to establish the measure of Republican elite cues.

(D-	Harry Reid	Speaker O'Neill
Al Gore	Jim Wright	Speaker Pelosi
Barack Obama	Joe Biden	Speaker Wright
Bill Clinton	John Kerry	Tip O'Neill
Democrat	Michael Dukakis	Tom Daschle
democrat	Nancy Pelosi	Tom Foley
Democratic	President Clinton	Vice President Biden
democratic	President Obama	Vice President Gore
George Mitchell	Robert Byrd	Walter Mondale
Gephardt	Speaker Foley	

Table A2. Democratic party dictionary. Lists the keywords and phrases we searched for to establish the measure of Democratic elite cues.

Congressman	lt. governor	Speaker of the House
Congresswoman	Majority Leader	state Representative
Governor	Minority Leader	State Representative
governor	Rep.	state senator
Lieutenant Governor	Representative	State Senator
lieutenant governor	Sen.	
Lt. Governor	Senator	

Table A3. General politician dictionary. Lists the keywords and phrases we searched for to establish the measure of general political cues.

Doctor	Experts	researcher
doctor	experts	Researchers
Doctors	Prof	researchers
doctors	prof	Scientist
Dr	Professor	scientist
dr	professor	Scientists
Expert	Professors	scientists
expert	professors	
Expert	Researcher	

Table A4. Expert dictionary. Lists the keywords and phrases we searched for to establish the measure of expert cues.

Advancement Of Sound Science Center	Institute For Study Of Earth And Man
American Council On Science And Health	International Climate And Environmental Change Assessment Project
Australian Climate Science Coalition	International Climate Science Coalition
Center For Study Of Carbon Dioxide And Global Change	Junkscience
Co2 Is Green	Lindenwood University
Cooler Heads Coalition	National Council For Environmental Balance
Environmental Literacy Council	National Environmental Policy Institute
George Marshall Institute	New Zealand Climate Science Coalition
George C. Marshall Institute	Oregon Institute Of Science And Medicine
Global Warming Policy Foundation	Plants Need Co2 Org
Greening Earth Society	Science And Environmental Policy Project
Independent Commission On Environmental Education	Science And Public Policy Institute
Institute For Biospheric Research	Smithsonian Astrophysical Observatory
Biospheric Research Institute	Statistical Assessment Service
Institute For Regulatory Science	Weidenbaum Center

Table A5. Climate skeptic dictionary. Lists the keywords and phrases we searched for to establish the measure of organizations whose sole mission is climate denial, the so-called “Merchants of Doubt”. List comes from Farrell (2016).

American Coal Foundation	National Association Of Manufacturers
American Coalition For Clean Coal	National Black Chamber Of Commerce
American Farm Bureau	National Mining Association
American Fuel And Petrochemical Manufacturers	National Petroleum Council
American Gas Association	National Rural Electric Cooperative Association
American Natural Gas Alliance	Peabody Energy
American Petroleum Institute	Shook Hardy And Bacon
Association Of Global Automobile Manufacturers	Us-Russia Business Council
Chamber Of Commerce	American Energy Alliance
Dci Group	Americans For Balanced Energy Choices
Edison Electric Institute	Citizens For Affordable Energy
Exxon	Coalition For Vehicle Choice
Exxon Mobile	Coalition For American Jobs
Federation For American Coal Energy And Security	Consumer Energy Alliance
Global Climate Coalition	Industrial Energy Consumers Of America
Independent Petroleum Association Of America	Small Business Survival Committee
Intermountain Rural Electric Association	United For Jobs
Koch Industries	

Table A6. Industry and Astroturf groups dictionary. Lists the keywords and phrases we searched for to establish the measure of industry and astroturf organizations. List comes from Farrell (2016).

60 Plus Association
Accuracy In Media
Action Institute
Alexis De Tocqueville Institution
American Conservative Union
American Council For Capital Formation
American Energy Freedom Center
American Enterprise Institute
American Friends Of Institute Of Economic Affairs
American Legislative Exchange Council
American Policy Center
American Spectator Foundation
American Tradition Institute
Americans For A Limited Government
Americans For Prosperity
Americans For Tax Reform
Annapolis Center
Atlantic Legal Foundation
Atlas Economic Research Foundation
Capital Research Center And Greenwatch
Capital Research Center
Greenwatch
Cascade Policy Institute
Cato Institute
Center For American And International Law
Center For Defense Of Free Enterprise
Center For Security Policy
Center For Strategic And International Studies
Centre For New Europe
Charles Koch Institute
Citizens For A Sound Economy
Collegians For Constructive Tomorrow
Committee For Constructive Tomorrow
Communications Institute
Competitive Enterprise Institute
Consumer Alert
Consumers Alliance For Global Prosperity
Cornwall Alliance For The Stewardship Of Creation
Defenders Of Property Rights
Donors Trust
Donors Capital Fund
Energy Makes America Great
Environmental Conservation Organization
Federalist Society
Fraser Institute
Free Enterprise Education Institute
Freedom Action
Freedomworks
Frontiers Of Freedom Institute
George Mason University Law And Economics Center
Heartland Institute
Heritage Foundation
Hoover Institution
Hudson Institute
Illinois Policy Institute
Independence Institute
Independent Institute
Independent Womens Forum
Initiative For Public Policy Analysis
Institute For Energy Research
Institute For Liberty
Institute Of Humane Studies
Institute Of Public Affairs
International Council For Capital Formation
International Policy Network
International Republican Institute
James Madison Institute
John Locke Foundation

Knowledge And Progress Fund	Oklahoma Council Of Public Affairs
Koch Foundation	Pacific Legal Foundation
Landmark Legal Foundation	Pacific Research Institute For Public Policy
Legal Center For The Public Interest	Property And Environment Research Center
Lexington Institute	Reason Foundation
Locke Institute	Responsible Resources
Mackinac Center	South Eastern Legal Foundation
Manhattan Institute	Sovereignty International
Media Research Center	State Policy Network
Mercatus Center	Tech Central Science Foundation
Mountain States Legal Foundation	Texas Public Policy Foundation
National Center For Policy Analysis	Thomas Jefferson Institute
National Center For Public Policy Research	Tsaugust
National Wilderness Institute	Virginia Institute For Public Policy
National Policy Forum	Washington Legal Foundation
National Taxpayers Union	Washington Policy Center

Table A7. Conservative think tank and advocacy group dictionary. Lists the keywords and phrases we searched for to establish the measure of conservative think tanks and advocacy organizations. List comes from Farrell (2016b).

Adrian Gordon	Asmunn Moene	Chris Yakymyshyn
AF Smith	Atholl Sutherland-Brown	Christiaan Van Sumere
Ahmed Boucenna	August Auer	Christopher Essex
Alan Moran	Austin Hogan	Christopher Monckton
Albert Engelhardt	Barry Berman	CJF Boettcher
Albert Gold	Benjamin Herman	Claude Culross
Albert Jacobs	Benny Peiser	Cliff Ollier
Albrecht Glatzle	Bernd Huettner	Clive Schaupmeyer
Alex Robson	Berol Robinson	Colin Barton
Alexander Kaplan	Bill Kappel	Cornelis van Kooten
Alexander Robertson	Bjarne Andresen	Craig Idso
Alfred Pekarek	Bjorn Malmgren	Curt Rose
Alister McFarquhar	Bob Breck	Curtis Osgood
Allan Cortese	Bob Zybach	Dalcio Dacol
Allen Simmons	Boris Winterhalter	Dan Carruthers
Amos Meyer	Brian Fiedler	Daniel Joseph Pounder
Andre Bernier	Brian Pratt	Daniel McNaughton
Andreas Prokoph	Brian Sussman	Dave Dahl
Andrei Illarionov	Brian Valentine	David Aubrey
Andrew Detwiler	Bruce Boe	David Bellamy
Andrew Kaldor	Bruce Borders	David Deming
Anthony Lupo	Bruce Bullough	David Douglass
Anthony Watts	Bruce Schwoegler	David Evans
Anton Uriarte	Bruce West	David Gee
Antonio Zichichi	Bryan Leyland	David Gray
Arie Bodek	Bryce Wilkinson	David Hagen
Arlin Super	Charles Anderson	David Henderson
Arnold Woodruff	Charles Clough	David Holtkamp
Art Horn	Charles Hammons	David Kear
Arthur Anderson	Charles Wax	David Legates
Arthur Bourne	Chauncey Starr	David Nowell
Arthur Chadwick	Chris Borel	David Rogers
Arthur Robinson	Chris de Freitas	David Wojick
Arthur Rorsch	Chris Schoneveld	Denis Dutton

Dennis Avery	Forese-Carlo Wezel	Goran Tullberg
Detlef Hebert	Franco Battaglia	Gordon Fulks
Diane Douglas	Frank Milne	Gordon Oehler
Dick Morgan	Frank Paolini	Gordon Swaters
Dick Thoenes	Frank Tipler	Graham Smith
Don Aitkin	Fred Decker	Grant Goodell
Don Easterbrook	Fred Goldberg	Gregory Balle
Donald Farley	Fred Michel	Gregory Canavan
Donald N Parkes	Fred Singer	Habibullo Abdussamatov
Donald Rapp	Fred Starheim	Hans Erren
Doug Hoffman	Frederick Bopp	Hans Jelbring
Douglas Barr	Frederick Seitz	Hans Labohm
Douglas Hoyt	Frederick Singer	Harald Kehl
Douglas Leahey	Freeman Dyson	Harold Agnew
Douglas Southgate	Gabriel T Csanady	Harrison Schmitt
Duwayne Anderson	Garth Paltridge	Harry Lins
Earl Droessler	Gary Kubat	Harry Priem
Earle Williams	Gary Sharp	Harry Ringermacher
Eckhard Grimmel	Geoff Austin	Hazen Bedke
Edgar Gartner	Geoffrey Duffy	Heinz Hug
Eduardo Ferreyra	George Chilingar	Heinz Lettau
Eduardo Tonni	George Kukla	Heinz Sundermann
Edward Blick	George McVehil	Helmut Metzner
Edward Brandes	George Reilly	Hendrik Tennekes
Edward Liebsch	George Stroke	Henry Linden
Edward Terry Wimberley	George Sutton	Horst Malberg
Edward Tomlinson	George Taylor	Howard Greyber
Edward Wegman	George Wolff	Howard Hayden
Edwin Berry	Gerd-Rainer Weber	Howard Maccabee
Eigil Friis-Christensen	Gerhard Gerlich	Hugh Ellsaesser
Elliot Abrams	Gerhard Kramm	Ian Bock
Endel Lippmaa	Gerrit van der Lingen	Ian Clark
Ernst-Georg Beck	Goesta Walin	Ian Plimer
Ferenc Marc Miskolczi	Goran Ahlgren	Indur Goklany

Ingemar Nordin	John Brignell	Kesten Green
Ismail Bhat	John Brosnahan	Kiminori Itoh
Ivar Giaever	John Christy	Kirill Kondratyev
Jack Barrett	John Coleman	Klaus Heiss
Jack Hollander	John Emsley	Klaus Wyrтки
Jack Wedel	John Ferguson	Laim Nagle
James Brooks	John Gaynor	Lance Endersbee
James Buckee	John Lindl	Larry Brace
James Clarke	John Maunder	Laurence Gould
James DeMeo	John McGinley	Lee Eddington
James Dent	John McLean	Lee Gerhard
James Goodridge	John Nicol	Len Walker
James Heimbach	John Ralph Apel	Leonid Khilyuk
James Koermer	John Reinhard	Les McDonald
James Lea	John Rhoads	Leslie Lemon
James Marusek	John Shade	Lev Gandin
James Moore	Jon Jenkins	Lord Nigel Lawson
James O'Brien	Jonathan Katz	Louis Fowler
James Peden	Jose Carlos de Almeida Azevedo	Louis Hissink
James Weeg	Josef Zboril	Lowell Brown
Jarl Ahlbeck	Joseph Bast	Lubos Motl
Jay Lehr	Joseph Cain	Madhav Khandekar
Jean Thiebaut	Joseph D'Aleo	Malcolm Taylor
Jennifer Marohasy	Joseph Kunc	Manik Talwani
Jens Feder	Joseph Silverman	Marcel Leroux
Jerry Cuttler	Joseph Zabransky	Mark Campbell
Jerry Williams	JP Lodge	Martin Coniglio
Jim Mitroy	Katya Georgieva	Martin Hertzberg
Jiri Blumel	Keith Hage	Matthew Bastardi
Jock Allison	Keith Lockitch	Maureen Gallagher
Joe Bastardi	Kelvin Kemm	Melvyn Shapiro
Joel Kauffman	Kenneth Beard	Michael Clover
John Bales	Kenneth Green	Michael Coffman
John Blaylock	Kenneth Haapala	Michael Fox

Michael Garstang	Patrick Powell	Richard Lindzen
Michael Hignatsberger	Paul Copper	Richard Mackey
Michael Mogil	Paul Drallos	Richard Newsome
Michael N Monce	Paul Driessen	Richard Shepherd
Michael Uhart	Paul Grant	Rigoberto Garcia
Michael Vershovsky	Paul Handler	Roar Larsen
Mike Gruntman	Paul Mielke	Roar Larson
Miklos Zagoni	Paul Queneau	Rob Meleon
Milos Setek	Paul Reiter	Rob Scagel
Mitchell Taylor	Per Engene	Robert Ashworth
Moorad Alexanian	Peter Arnold Toynbee	Robert Austin
Nathaniel Guttman	Peter Dietze	Robert Balling
Neil Frank	Peter Friedman	Robert Carter
Neil Hutton	Peter Giddings	Robert Cunningham
Neil Waterhouse	Peter Leavitt	Robert Dunshee Elliott
Nicola Scafetta	Peter Link	Robert Durrenberger
Nigel Calder	Peter Oliver	Robert Essenhigh
Nils-Axel Moerner	Peter Ridd	Robert Gauldie
Nir Shaviv	Peter Salenius	Robert Jacomb Foster
Norman MD Brown	Peter Stilbs	Robert Knox
O'Dean Judd	Petr Chylek	Robert Kovach
Olav Kvalheim	Philip Stott	Robert LeLevier
Olavi Karner	Phillip Mange	Robert Levine
Ole Humlum	Piers Corbyn	Robert Neff
Oleg Pokrovsky	RAD Byron-Scott	Robert Perkins
Oleg Sorokhtin	Ralf T'scheuschner	Robert Roper
Otto Franzle	Raphael Wust	Robert Roseman
Owen McShane	Read McGrath	Robert Stevenson
Paal Brekke	Reid Bryson	Robert Wentworth
Paavo Siitam	Renato Henriques	Robert Whitten
Pat Palmer	Rich Weiss	Robert Zabrecky
Patrick Frank	Richard Becherer	Robin Vaughan
Patrick Michaels	Richard Courtney	Roderick Van Koughnet
Patrick Moore	Richard Keen	Rodger Gamblin

Rodney Nichols	Stewart Franks	Walter Starck
Roger Cohen	Stuart Berger	Warren Anderson
Roger Dewhurst	Sultan Hameed	Warren Berning
Roger Pielke	Susan Crockford	Warwick Hughes
Roger Pocklington	Syun-Ichi Akasofu	Wayne Goodfellow
Roger Young	Szymon Suckewer	Wayne Kraus
Romuald Bartnik	T Jim Sprott	Wayne Martin
Ronald Sundelin	Tad Murty	Werner Baum
Ross Hays	Tatiana Valentinovna	Wibjorn Karlen
Ross McKittrick	Ted Hinds	William Alexander
Roy Leep	Terrance Clark	William Briggs
Roy Spencer	Terrell Johnson	William de Lange
Rune Larsen	Terry Dunleavy	William Evans
RWJ Kouffeld	Terry Jackson	William Gray
Sallie Baliunas	Theodor Landscheidt	William Happer
Sally Bernier	Thomas Gold	William Hubbard
Salomon Kroonenberg	Thomas Gray	William Kininmonth
Salvatore Torquato	Thomas Lockhart	William Lindqvist
Samuel Werner	Thomas Schmidlin	William Mitchell
Scott Armstrong	Thomas Sheahen	William Nierenberg
Sherwood Idso	Timothy Minnich	William Porch
Sonja Boehmer-Christiansen	Timothy Ball	William Reifsnyder
Soren Floderus	Timothy Calvin	William Schaffer
Stan Zlochen	Timothy Patterson	William Tanner
Stanley Goldenberg	Tom Quirk	Willie Soon
Stanley Robertson	Tom Segalstad	Wojciech Szalecki
Stanley Smith	Tom van Loon	Wolfgang Thune
Sten Kaijser	Tor Ragnar Gerholm	Zbigniew Jaworowski
Stephan Wilksch	Uberto Crescenti	
Stephen Brown	Vaclav Smil	
Stephen Murgatroyd	Vedat Shehu	
Steve Hynes	Vern Harnapp	
Steve Japar	Vincent Gray	
Steven Hanna	Vladimir Svidersky	

Table 8. Contrarian scientist dictionary. Lists the keywords and phrases we searched for to establish the measure of contrarian scientists. List comes from Anderegg et al. (2010) and was downloaded from http://www.eecg.utoronto.ca/~prall/climate/skeptic_authors_table_by_clim.html.

Operating definition of a climate change cue: *an explicit or implicit stance on climate change science or climate change policy attributed to either the Republican or Democratic Party or their elites in a newspaper article.*

Coders should look for the following:

- 1) Are any of the references to the Democratic or Republican Party or their politicians in the article part of a climate change cue? (Y/N; If N, move on to next article)
- 2) Is there a cue supportive of the scientific consensus? (Y/N)
 - a. Should be scored Y if there is:
 - i. An explicit recognition either that climate change is real and human-caused, or that most scientists concur; or
 - ii. Support a policy action to address climate change (irrespective of magnitude of policy and the support it receives from environmentalists and other pro-climate actors)
- 3) Is there a cue opposing the scientific consensus? (Y/N)
 - a. Should be scored N if:
 - i. Claim climate science is uncertain; and/or
 - ii. Deny science of climate change full stop; and/or
 - iii. Oppose a proposal of climate change mitigation

Note: Articles can contain cues that run in both directions for a party. This can happen in the following situations (not inclusive):

- a. *Opposing cues with same party in an article (e.g. John McCain vs. other Republicans)*
- b. *Contradictory policy (e.g. oppose Kyoto, but support alternative climate change policy action)*
- c. *Changing opinions of same politician (e.g. Mitt Romney)*
- d. *Accept climate change is happening (consistent with Y), but reject proposed policy action (consistent with N)*
- e. *Claim science is uncertain (consistent with N), but support funding of more research on climate change impacts, and/or policy to mitigate potential risk of climate change (consistent with Y; common in early years)*

For cues that are coded N on the second test and Y on the third (pure anti-climate signal)

- 1) Economy: is justification to opposing climate consensus, in part, related to economic concerns (jobs, the economy, economic competitiveness, need for developing world participation, energy costs, etc.)? (Y/N)
- 2) Uncertainty/Denial: is justification to opposing climate consensus, in part, related to alleged scientific uncertainty surrounding climate science or denying the seriousness, existence, or man-made nature of climate change? (Y/N)

Note: This is not all-inclusive. Many cues don't have clear justifications for positions.

Fig. A1 Coder Instructions. Instructions for the validation of party cues in an article, for coding direction of the messages, and for the nature of anti-climate messages.

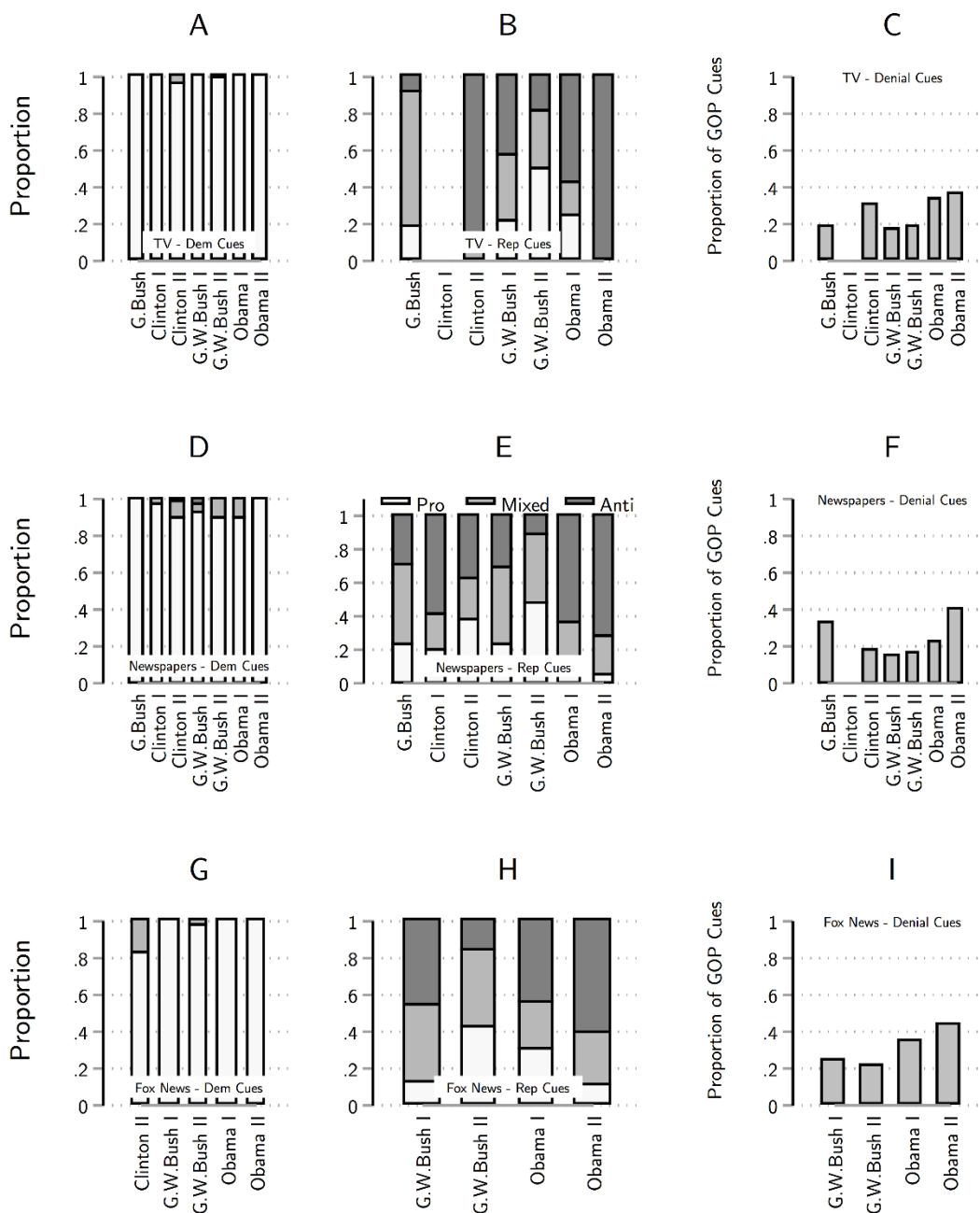


Fig. A2 Messages from party elites in media. (A) Democratic politicians in broadcast segments. (B) Republican politicians in broadcast segments. (C) Proportion of GOP messages in broadcast segments that make reference to uncertainty or denial of climate science. (D) Democratic politicians in newspaper articles. (E) Republican politicians in newspaper articles. (F) Proportion of GOP messages in newspaper articles that make reference to uncertainty or denial of climate science. (G) Democratic politicians in Fox News segments. (H) Republican politicians in Fox News segments. (I) Proportion of GOP messages in Fox News segments that make reference to uncertainty or denial of climate science.

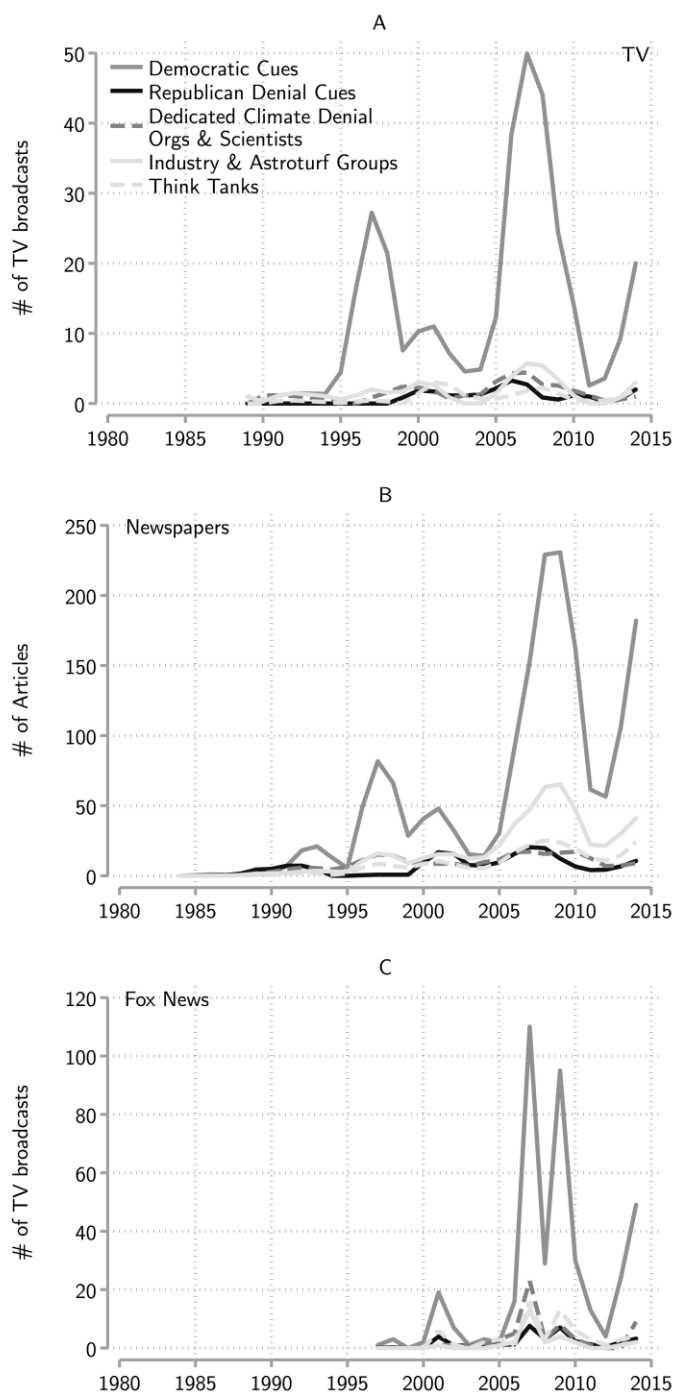


Fig. A3 The climate change media environment. (A) Total number of articles with cues from Democratic elites, Republican elites with denial messages, and three different categories of organized climate skeptics in broadcast segments. (B) Total number of articles with cues from Democratic elites, Republican elites with denial messages, and three different categories of organized climate skeptics in newspaper articles. (C) Total number of articles with cues from Democratic elites, Republican elites with denial messages, and three different categories of organized climate skeptics in Fox News transcripts. All series are smoothed at a bandwidth of 0.2.