NATIONAL SURVEY OF PUBLIC OPINION ON GLOBAL WARMING

STANFORD UNIVERSITY

RESOURCES FOR THE FUTURE

RECONMR

Interviewing conducted by ReconMR

Survey designed by

Jon A. Krosnick and Bo MacInnis (Stanford University)

with

Scholars from Resources for the Future

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Interview dates: May 28- August 10, 2020

Interviews: 502 adults nationwide
Margin of error: +/- 5.5 percentage points at the 95% confidence level for full sample results

Appendix A: 2020 National Survey of Public Opinion on Global Warming Method

The 2020 National Survey of Public Opinion on Global Warming involved telephone interviews with a representative sample of 502 adults living in the United States. 183 respondents were interviewed on a landline telephone, and 319 were interviewed on a cell phone. Interviewing was conducted from May 28 to August 10, 2020, in English. AAPOR's Response Rate 3 was 22% for the landline frame, 5% for the cell phone frame, and 9% for both.

Sample Design

Phone numbers used for this study were randomly generated from landline and cell phone sampling frames, with an overlapping frame design. The RDD landline sample was generated through Dynata. The Dynata RDD procedure produces an Equal Probability Selection Method (EPSEM) sample of randomly drawn telephone numbers from all working banks with one or more assigned numbers. The sample was generated shortly before the beginning of data collection to provide the most up-to-date sample possible, maximizing the number of valid telephone extensions. Additional sample was generated during the fielding period to ensure appropriate representation between census regions. The initial landline sample went through Dynata's disconnect screening process. The unlisted phone numbers are sent a 'pulse' to determine switch status. If the switch is not active, the number is flagged disconnected. If the switch is active, the system uses post-call analysis to determine if the number is disconnected (SIT, fax, fast busy etc.) or working (no answer, live answer, answering machine).

The RDD Cell Phone sample was generated by Dynata. Dynata starts with the most recent monthly Telcordia TPM (Terminating Point Master) Data file. This is Telcordia's master file of NPA-NXX and Block-ID records for the North American Number Plan. It contains at least one record per NPA-NXX. For prefixes (NPA-NXXs) where 1000-block number pooling is in effect, this file also provides information for individual 1000-blocks. This allows users to identify those 1000-blocks that have either not been assigned for service or that have been allocated to different service providers. "Mixed" or "shared" 100-blocks (NXXTYPES 50, 54, 66) are then compared to Dynata's list---assisted RDD database. 100-blocks with no listed numbers are retained in the wireless frame and 100-blocks containing listed numbers on the RDD frame are removed. The result is a frame of 100-blocks that is mutually exclusive of Dynata's list-assisted RDD frame while allowing coverage in prefixes and 1000-blocks that potentially provide both landline and wireless service.

Field Procedures

Because of the onset of the global Covid-19 Pandemic and in order to provide a safe environment for the employees to work, ReconMR shut down on-site operations in March 2020, and turned it into a virtualized call center environment. As such, the survey was conducted by interviewers working from home. Measures were taken to ensure data security and the continued adherence to data quality and data collection standards for ReconMR's work from home solution. Interviewers were set up to connect to ReconMR's data center via a secure, private VPN tunnel. This solution employs end-to-end encryption as well as multi-factor authentication. In addition, all servers remained behind a secure firewall, and all calls were initiated from on-premises devices. ReconMR work-from-home solution allowed for all agents to continue to be live-monitored for quality assurance via our Voxco audio and video monitoring systems.

Interviews were conducted using computer-assisted telephone interviewing (CATI) software. Interviewer training was conducted prior to the study pilot. CATI interviewers received an annotated questionnaire and project materials that explained the history, background, and goals of the study. The background and overview training of the study's various components was followed by a detailed CATI program training. Experienced project team supervisors and trainers spent time reviewing both questionnaires one question at a time with each interviewer. The goal was to fully explain the proper delivery of each question and the reasoning and intent behind all the sections and response option in

each questionnaire. Interviewers spent a great deal of time practicing with the CATI program and conducting mock interviews with each other and the data collection supervisors. Interviewers were carefully trained to ask for the youngest male or the youngest female currently at home when calling a landline. Interviewers were also trained at explaining the purpose of the study, how to gain respondent cooperation by explaining the inherent benefits of the research, how the project will benefit the public good and how to answer respondent's questions, as well as how to record respondents' answers accurately.

In order to maximize survey participation, the following procedures were enacted during the field period:

- Up to 5 follow-up attempts were made to contact non-responsive numbers (e.g. no answer, busy, answering machine). Exception was made to records flagged as belonging to census groups greater than 50% Hispanic. These cases received up to 7 follow-up attempts to non-responsive numbers.

- Non-responsive numbers were contacted multiple times, varying the times of day, and the days of the week that call-backs were placed.

- Interviewers stressed that the study was done for research purposes and that responses were strictly confidential and, when asked, they stated as accurately as possible the expected length of the interview. In addition, interviewers were provided with responses to possible respondent concerns raised during interviews, in order to minimize break offs.

- Respondents were offered the option of scheduling a call-back at their convenience.

- Households where the initial call resulted in respondents hanging up the phone or breaking off during the interview were called back after a 28-hour delay in an attempt to convert into a completed interview. Interviewers received special instructions on how to handle these calls.

- Respondents reached by cell phone were offered $10 if they requested compensation for their time. No such cell phone complaints were made during fielding of either study.

Quality/Data Verification

Project supervisors validated 10% of each interviewer's completed surveys by calling back the respondent and verifying specific responses. Additionally, supervisors continually monitored live calls through ReconMR's call monitoring system in order to ensure proper interviewing procedures were maintained.

Appendix B: 2020 National Survey of Public Opinion on Global Warming Weighting

This Appendix describes the two-stage procedure used to construct weights for the 2020 National Survey of Public Opinion on Global Warming.

During the first stage, each respondent was assigned a base weight that accounted for unequal probability of selection. The second stage introduced adjustments to the base weights so that sample distributions of target variables match distributions of those same variables in the in the U.S. adult population. More details about each of these stages are provided below.

Stage 1: Constructing base weights

A base weight was constructed for each respondent to account for unequal selection probabilities. Some respondents could have been contacted by via multiple telephone numbers (mobile and/or landline), and for some telephone numbers persons other than the respondent may also have been reachable. The base weights account for these differences by assigning respondents who could have been contacted via several telephone numbers a value that is proportionally smaller that values assigned to respondents who could have been contacted via fewer numbers.

The base weights were constructed by first computing a total number of "selection opportunities" for each respondent. Each selection opportunity for a respondent is the probability of selecting the respondent via one of the telephone numbers by which she or he could have been contacted. Each selection opportunity is based on the assumption that mobile device telephone numbers are not shared with other adults while landline telephone numbers are shared with all adults in a household. This means the probability of selecting the respondent if a respondent's mobile device telephone number had been dialed is 1.00. However, for landline telephone numbers the selection opportunity is proportional to the number of adults in a household. For example, the probability of selecting the respondent if the respondent's landline telephone number had been dialed and the respondent lives in a household with three other adults would be ¼ or .25. The selection opportunities across all telephone numbers by which a respondent could have been reached were summed to produce a "total selection opportunities" for each respondent.

Two transformations to each respondent's total selection opportunities produced the base weights. First, 1 was divided by each respondent's total selection opportunities to produce values that decreased proportionally to increases in total selection opportunities. Second, the values produced by the first transformation were divided by the mean value for a sample. This second transformation produced base weights for the respondents with a sample mean value of 1.00.

Stage 2: Post-stratification

Post-stratification using ANESRake in R was used to adjust the base weights to produce weights that brought sample distributions in line with U.S. adult population distributions in terms of sex, age combined race and ethnicity, education, census region, and telephone use. The U.S. adult population distributions of sex, age combined race and ethnicity, education, and census region were based on data from the March 2020 Current Population Survey (CPS). The U.S. adult population distribution of telephone use was based National Health Interview Survey data collected during the first six months of 2019 and published by the National Center for Health Statistics (Blumberg & Luke, May, 2020).[1]

[1] Blumberg, Stephen J. and Julian V. Luke. May, 2020. Wireless substitution: Early release of estimates from the National Health Interview Survey, January–June 2019. National Center for Health Statistics. Available from: https://www.cdc.gov/nchs/nhis.htm.

Post-stratification raking using ANESRake in R was conducted such that the one-way marginal distributions of the preceding demographic variables in the sample converged on the one-way marginal distributions of those variables in the U.S. adult population. Post-stratification raking was conducted using only variables for which all categories included at least 5% of the U.S. adult population and 5% of the sample, and for which the percentage in the U.S. adult population differed from the percentage in the sample by at least 5 percentage points.[2] The weights produced by post-stratification raking were constrained such that no weight was greater than 5, and the mean weight was 1.

Effects of weighting

Weights produced by post-stratification brought the sample distributions into alignment with population distributions. Table 1 includes the U.S. adult population distributions of variables used in post-stratification raking, as well as the unweighted, base weighted, and post-stratification weighted sample distributions of those variables. The table also include U.S adult population and sample distributions of variables that were not used in post-stratification. For all categories of variables used in post-stratification, no difference between the post-stratification weighted sample and U.S. adult population was greater than 1.5 percentage points. Thus, no difference exceeded the 5 percentage points identified by DeBell and Krosnick (2009) as a criterion for additional post-stratification adjustment.

The design effect associated with the final (post-stratification) weights was 1.56.

[2] This strategy follows recommendations in DeBell, Matthew and Jon A. Krosnick. 2009. *Computing Weights for American National Election Study Survey Data*, ANES Technical Report Series, No. nes012427.

Table 1. Distributions of variables in the U.S. adult population and the second questionnaire sample (variables used for post-stratification raking are in **bold**).

		Sample (N=502)				
Variable	Category	Unweighted	Base weighted	Base weighted plus post-stratified	U.S. adult population	Difference between base weighted plus post-stratified and U.S. adult population
Sex	**Male**	**46.8%**	**48.6%**	**49.8%**	**48.3%**	**1.5%**
	Female	**52.4%**	**50.8%**	**49.8%**	**51.7%**	**-1.9%**
	Missing	**.8%**	**.6%**	**.6%**	**.0%**	
	Total	**100.0%**	**100.0%**	**100.2%**	**100.0%**	
Age	**18 to 24 years old**	**7.6%**	**8.4%**	**11.6%**	**11.5%**	**.1%**
	25 to 34 years old	**8.8%**	**8.4%**	**17.7%**	**17.9%**	**-.1%**
	35 to 44 years old	**11.8%**	**11.6%**	**16.3%**	**16.4%**	**-.1%**
	45 to 54 years old	**14.7%**	**14.1%**	**15.9%**	**15.9%**	**.0%**
	55 to 64 years old	**22.1%**	**23.1%**	**16.7%**	**16.8%**	**-.1%**
	65 years old or older	**34.7%**	**34.3%**	**21.5%**	**21.5%**	**.0%**
	Missing	**.4%**	**.4%**	**.2%**	**.0%**	
	Total	**100.0%**	**100.2%**	**100.0%**	**100.0%**	
Combined race and Hispanicity	**Hispanic**	**9.2%**	**9.4%**	**16.7%**	**16.7%**	**.1%**
	White	**68.9%**	**70.1%**	**62.7%**	**62.7%**	**.0%**
	Black	**8.4%**	**8.2%**	**12.0%**	**11.9%**	**.0%**
	Other	**13.5%**	**12.2%**	**8.6%**	**8.7%**	**-.1%**
	Missing	**.0%**	**.0%**	**.0%**	**.0%**	
	Total	**100.0%**	**99.8%**	**100.0%**	**100.0%**	
Education	**No diploma**	**3.6%**	**3.6%**	**9.8%**	**9.8%**	**-.1%**
	High school	**17.9%**	**16.3%**	**27.3%**	**27.7%**	**-.5%**
	Some college	**27.7%**	**28.1%**	**27.5%**	**27.8%**	**-.3%**
	Bachelor's degree	**25.3%**	**26.5%**	**22.1%**	**22.0%**	**.1%**
	Advanced degree	**24.7%**	**24.7%**	**12.7%**	**12.6%**	**.1%**
	Missing	**.8%**	**.8%**	**.8%**	**.0%**	
	Total	**100.0%**	**100.0%**	**100.2%**	**100.0%**	
Census region	**Northeast**	**17.7%**	**18.3%**	**17.5%**	**17.4%**	**.1%**
	Midwest	**21.5%**	**21.7%**	**21.3%**	**20.7%**	**.6%**
	South	**35.5%**	**35.1%**	**35.3%**	**38.0%**	**-2.7%**
	West	**24.7%**	**24.3%**	**25.3%**	**23.8%**	**1.5%**
	Missing	**.6%**	**.6%**	**.6%**	**.0%**	
	Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Phone service	**Not mobile only**	**46.2%**	**44.8%**	**39.2%**	**40.1%**	**-.9%**
	Mobile only	**51.0%**	**52.4%**	**58.4%**	**59.9%**	**-1.5%**
	Missing	**2.8%**	**2.8%**	**2.4%**	**.0%**	
	Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	
Race	White only	74.1%	75.1%	71.9%	77.5%	-5.6%
	Black only	8.8%	8.6%	12.9%	12.7%	.2%
	Other/Mixed	17.1%	16.1%	15.1%	6.3%	8.8%
	Missing	.0%	.0%	.0%	.0%	
	Total	100.0%	99.8%	100.0%	96.6%	
Hispanic	Yes	9.2%	9.4%	16.7%	16.7%	.1%
	No	88.6%	88.2%	82.3%	83.3%	-1.0%
	Missing	2.2%	2.2%	1.0%	.0%	
	Total	100.0%	99.8%	100.0%	100.0%	
Marital status	Married	51.6%	51.2%	44.8%	53.1%	-8.3%
	Not married	48.0%	48.2%	54.8%	46.9%	7.9%
	Missing	.4%	.4%	.2%	.0%	
	Total	100.0%	99.8%	99.8%	100.0%	
Income	Less than $35,000	20.9%	19.7%	23.3%	23.5%	-.2%
	$35,000 to $49,999	11.4%	11.6%	11.8%	12.8%	-1.0%
	$50,000 to $74,999	12.5%	13.1%	13.7%	18.7%	-4.9%
	$75,000 to $99,999	12.9%	12.9%	13.3%	13.3%	.1%
	$100,000 or more	29.7%	29.7%	25.7%	31.8%	-6.1%
	Missing	12.5%	13.3%	12.0%	.0%	
	Total	100.0%	100.4%	99.8%	100.0%	