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## Shifting views on “global warming” and “climate change” in the United States

## ARTICLE INFO

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Since the release of a 2002 internal memo by Frank Luntz calling on the Bush Administration to avoid the term “global warming” in favor of the less urgent-sounding “climate change” (Lee, 2003), there has been scholarly interest in whether these terms matter for how the public perceives this issue (Villar & Krosnick, 2011). Indeed, research has found that the terms evoke different mental images (Lorenzoni, Leiserowitz, de Franca Doria, Poortinga, & Pidgeon, 2006), carry divergent cognitive associations (Whitmarsh, 2009), and elicit different levels of existence beliefs among the U.S. public (i.e., less belief in “global warming” than “climate change”), especially among Republicans (Schuldt, Enns, & Cavaliere, 2017; Schuldt, Konrath, & Schwarz, 2011; Schuldt, Roh, & Schwarz, 2015).<sup>1</sup>

Soutter and Mottus (2020) argue that the term used to represent the issue (“global warming” versus “climate change”) no longer affects existence beliefs. Given that certainty about this issue has increased in the U.S. since the original data were collected in 2009 (Ballew et al., 2019), it is reasonable to suspect that the global warming/climate change distinction no longer matters. Therefore, Soutter and Mottus's (2020) findings are potentially important; however, their analysis unfortunately cannot speak directly to this question. To assess changes over time, surveys need comparable questions and comparable samples. Whereas the original studies used nationally representative samples of U.S. adults drawn from the RAND Corporation's American Life Panel (Schuldt et al., 2011) and GfK/Knowledge Networks' KnowledgePanel (Schuldt et al., 2015, 2017), Soutter and Mottus (2020) used an opt-in convenience sample recruited from a number of online platforms including Prolific, Twitter, Facebook, Social Psychology Network, Psychology Research On the Net, Call for Participants, SurveyCircle, Poll-Pool, SurveyTandem, and various Reddit forums. Their study also sampled respondents over a 15-month period and screened for

eligibility based on political orientation. Although Soutter and Mottus (2020) describe their study as a replication, these differences make it difficult to determine whether their results reflect the disappearance of the original effect or different sampling methods.<sup>2</sup>

Fortunately, during the time window in which Soutter and Mottus (2020) collected their data (specifically, from December 13 to 17, 2018), we happened to conduct a replication of Schuldt et al. (2017), which had shown that the original effect (Schuldt et al., 2011) was detectable more than seven years later using a simplified wording treatment. Our 2018 replication study<sup>3</sup> was based on a probability-based sample of 1,021 U.S. adults from the AmeriSpeak Panel maintained by NORC at the University of Chicago, and also examined whether the U.S. public would differentially attribute “global warming” and “climate change” to human activities versus natural processes, respectively—a difference suggested by previous work (Whitmarsh, 2009) and which Soutter and Mottus (2020) suggest may no longer exist.

With regards to existence beliefs, we do not observe a question wording effect in our 2018 study. An overwhelming percentage of respondents believe “global warming” and “climate change” are really happening (Fig. 1): 84.4% (i.e., 443 out of 525) responded “Yes, definitely” or “Yes, somewhat” in the global warming condition, as compared to 87.4% (i.e., 430 out of 492) who responded this way in the climate change condition ( $\chi^2(1, N = 1017) = 1.90, p = .17, \phi = 0.04$ ).<sup>4</sup> Although we observed a larger difference among Republicans (GW: 72.7% vs. CC: 77.6%) than Democrats (GW: 94.2% vs. CC: 95.1%), neither the interaction between question wording and party identification ( $B = 0.10, SE = 0.55, p = .86$ ) nor the Republican-specific wording effect ( $\chi^2(1, N = 255) = 0.82, p = .37, \phi = 0.06$ ) was significant.<sup>5</sup>

<sup>1</sup> See Morin-Chassé and Lachapelle (2019) for a reanalysis of Schuldt et al. (2015) showing that strength of partisan identification moderates the effect of global warming/climate change terminology on existence beliefs.

<sup>2</sup> Given Soutter and Mottus's (2020) interest in replicating previous studies, we focus on their analysis of U.S. data, but the same argument applies to their international data.

<sup>3</sup> This study was deemed exempt by the Institutional Review Board at Cornell University. Data and study materials for the 2018 study are available through the Roper Center for Public Opinion Research at Cornell University (<https://ropercenter.cornell.edu/CFIDE/cf/action/catalog/abstract.cfm?archno=31117259>).

<sup>4</sup> Following Miratrix, Sekhon, Theodoridis, and Campos (2018), we report unweighted sample average treatment effects in the text. In addition, we report weighted population average treatment effects in footnotes, which in all cases yield substantively equivalent results: 85.2% responded “Yes, definitely” or “Yes, somewhat” in the climate change condition, as compared to 83.4% who responded this way in the global warming condition ( $\chi^2(1, N = 1017) = 0.37, p = .54, \phi = 0.02$ ).

<sup>5</sup> Political party identification was measured using the standard AmeriSpeak item: “Do you consider yourself a Democrat, a Republican, an independent or none of these?” Again, applying post-stratification weights does not substantively change the results (e.g., GW: 69.2% vs. CC: 75.1%,  $p = 0.43$ , for the Republican-specific wording effect).

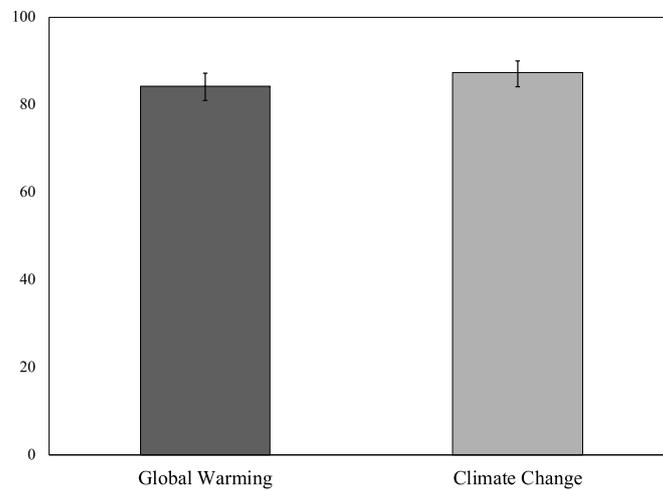


Fig. 1. Percentage indicating they “definitely” or “somewhat” believe global warming or climate change is really happening in our 2018 study. Error bars are 95% confidence intervals.

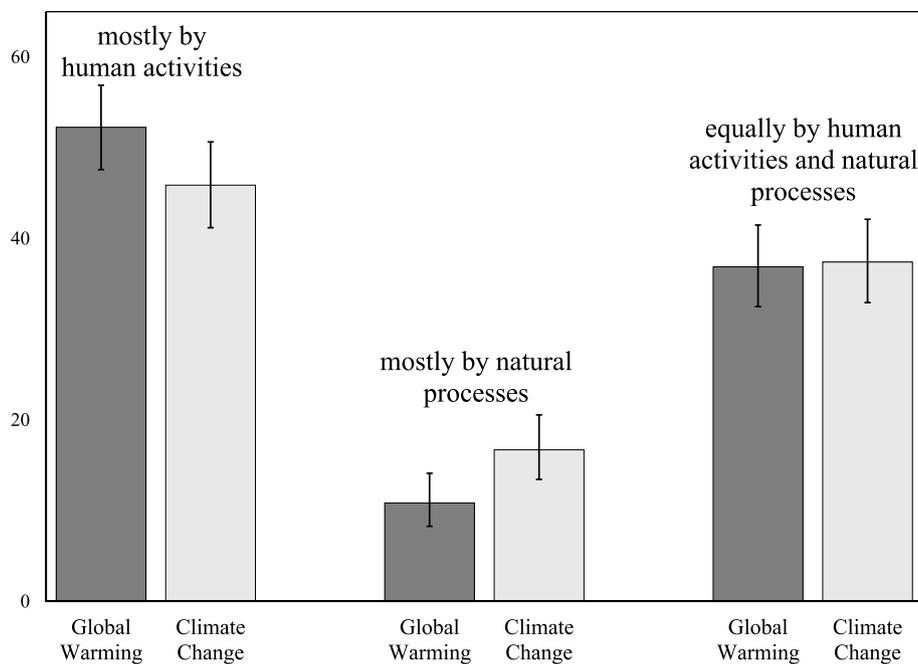


Fig. 2. Percentage indicating global warming or climate change is caused mostly by human activities, mostly by natural processes, or both equally in our 2018 study. Error bars are 95% confidence intervals.

Although the effect size was small, question wording did, however, significantly influence respondents' attributions to human activities versus natural processes. Directly following the existence belief question, respondents were asked “Do you think [global warming/climate change] is caused mostly by human activities, caused mostly by natural processes, or is it caused equally by human activities and natural processes?”<sup>6</sup> Respondents attributed “global warming” to human activities at a higher rate (52.3%) than “climate change” (45.9%) and attributed “climate change” to natural processes at a higher rate (16.7%) than “global warming” (10.9%) ( $\chi^2(2, N = 867) = 7.21, p = .03$ , Cramér's

<sup>6</sup> Because the attribution question presumes the issue is real, only respondents who responded “Yes, definitely” or “Yes, somewhat” on the belief item were eligible to answer the attribution question. Respondents received the same treatment for both questions ( $n = 442$  for global warming and  $n = 425$  for climate change).

$V = 0.09$ ) (Fig. 2).<sup>7</sup> Although this finding should be interpreted with caution until it is replicated in future research, it suggests that it may be premature to conclude that these terms no longer affect survey responses.

It is tempting to conclude that our results reinforce those of Soutter and Mottus (2020). However, it would be more accurate to say that similar results emerged from distinct samples of U.S. adults—a national

<sup>7</sup> Weighted results were substantively equivalent: CC: 40.5% mostly human activities, 19.8% mostly natural causes, 39.7% equally both; GW: 51.2% mostly human activities, 13.7% mostly natural causes, 35% equally both ( $\chi^2(2, N = 867) = 3.04, p = .049$ , Cramér's  $V = 0.06$ ). Not surprisingly, Democrats were more likely to attribute causation to human activities regardless of question wording (CC: 56.6% vs. GW: 67.2%), as compared to Republicans (CC: 26.7% vs. 24.0%). However, no interaction between question wording and party identification was observed.

probability sample and an opt-in convenience sample. Due to variations in composition, the latter has been shown to yield variable effect size estimates for experimental treatments in other environmental public opinion research (Goldberg, van der Linden, Ballew, Rosenthal, & Leiserowitz, 2019). Put simply, replications of survey experiments should not only replicate experimental treatments and question wording. They should also replicate the sampling procedure.

Substantively, our results suggest that the influence of global warming/climate change terminology has diminished for existence beliefs but may still matter for other responses that survey researchers and environmental psychologists care about. Given possible links between causal attributions and support for climate change policies (e.g., Bostrom et al., 2012; Jang, 2013), future research should attempt to replicate this and other question wording effects, which may naturally shift as public opinion on this issue continues to evolve.

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Jonathon P. Schuldt\*, Peter K. Enns\*\*  
Cornell University, Ithaca, NY, USA

E-mail addresses: [jps56@cornell.edu](mailto:jps56@cornell.edu) (J.P. Schuldt),  
[peterenns@cornell.edu](mailto:peterenns@cornell.edu) (P.K. Enns).

Sara Konrath  
Indiana University, Indianapolis, IN, USA

Norbert Schwarz  
University of Southern California, Los Angeles, CA, USA

\* Corresponding author. 465 Mann Library Building, Cornell University, Ithaca, NY, 14853, USA.

\*\* Corresponding author. 205 White Hall, Cornell University, Ithaca, NY, 14853, USA.