Framing Effects in Survey Design: How Iowa Producers' Beliefs in Climate Change Evolve Over Time

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Introduction and Literature Review

Rising climate variability poses escalating threats to U.S. agriculture, due to more frequent extreme weather events that jeopardize crop yields, strain water supplies, and endanger (USGCRP, 2018). Studies show that even in historically productive regions like the U.S. Corn Belt, farmers are already experiencing shifts in weather patterns, including erratic rainfall, warmer temperatures, and greater seasonal variability (Arritt, 2016; Angel et al., 2018). In Iowa, situated in the heart of the Corn Belt, the effects of climate change are particularly noticeable, as agriculture is a key component of the state's economy and rural identity (Bendorf et al., 2024). The observed impacts of climate change on Iowa's agriculture include longer growing seasons, rising temperatures, increased frequency of heat stress, and a heightened risk of drought and seasonal flooding, among other impacts (Bendorf et al., 2024), posing significant challenges to long-term agricultural resilience.

Understanding how farmers in Iowa perceive climate change is critical for designing effective outreach, risk communication and adaptation strategies. Researchers like Arbuckle et al. (2013) and Morton et al. (2017) found that many Midwestern producers are skeptical about anthropogenic climate change. For instance, only about 40% of corn-soybean farmers in the Upper Midwest believed that climate change was partially or mostly human-caused, 25% viewed it as a natural phenomenon, and the remaining 35% were either unsure or rejected the idea that climate change was occurring. Additionally, a systematic review by Chatrchyan et al. (2017) of 10 quantitative studies on U.S. farmers' beliefs found that farmers generally exhibit more uncertainty than the public regarding climate change and show limited recognition of its anthropogenic causes.

A substantial body of research has demonstrated that framing an issue can significantly influence public perception (Goffman, 1974; Lakoff & Johnson, 2003; Tewksbury, 2015). Framing refers to the intentional or unintentional process of presenting information in a way that defines a problem, attributes responsibility, and suggests potential solutions (Entman, 1993; Moy et al., 2016). In the context of climate change, a variety of frames are commonly used by stakeholders such as policymakers, environmental advocates, the media, and the public (Jaspal et al., 2016; Nisbet, 2009; Sonnett, 2010). These frames can trigger different cognitive and emotional responses (Shi et al., 2019), influence the likelihood of public engagement (Gifford & Comeau, 2011), and shape the type and level of support for addressing the negative impacts of climate change (Jiang et al., 2018). Notably, many public opinion polls on climate change continue to rely on terminologies like "global warming," which may carry different connotations compared to "climate change" (Schuldt, 2015). Research indicates that these words carry different meanings and interpretations. For example, "global warming" often evokes stronger associations with heat and human activity, while "climate change" tends to suggest broader environmental shifts and is frequently linked to natural processes (Leiserowitz et al., 2014). Political affiliations further shape these interpretations; conservatives are more likely to associate extreme heat with "global warming," whereas liberals are equally likely to link such events with

both terms (Schuldt & Roh, 2014). Furthermore, other findings suggest that the influence of wording may vary across different segments of the population (Villar et al., 2011). The differences have to potential to influence people's beliefs about climate change.

Previous studies have examined farmers' beliefs about climate change (Arbuckle et al., 2015; Borrelli et al., 2018; Mase et al., 2017; Morton et al., 2017). However, few studies have explored how these beliefs change over time, particularly in response to shifts in survey wording and framing. Even minor shifts in terminology, such as using "climate change" versus "global warming", can evoke different mental models, emotional responses, and political associations, ultimately influencing how respondents interpret and answer questions (Entman, 1993; Schuldt et al., 2015). This makes longitudinal comparisons challenging yet essential. Moreover, factors such as respondent attrition, demographic shifts and short-term funding cycles add further complications to multi-year studies. Understanding differences in the framing of climate change instruments and respondents' responses can assist in identifying gaps in climate change research and provide opportunities for improving research on this topic.

Theoretical Framework

This study was grounded primarily in framing theory, which explains how presentation of information shapes interpretation, evaluation and reported beliefs (Chong & Druckman, 2007; Entman, 1993; Nisbet, 2009). Frames highlight certain aspects of an issue while backgrounding others, influencing how individuals define problems, assign causality and consider implications.

A growing body of work demonstrates that the terms "climate change" and "global warming" are not interchangeable (Dunlap, 2014; Neumann et al., 2022; Soutter & Mõttus, 2020; Whitmarsh, 2009). For example, qualitative studies show that global warming is more often interpreted as human-caused and evokes stronger concern. In contrast, climate change is frequently viewed as a natural process and interpreted more neutrally (Whitmarsh, 2009). Experimental research finds similar differences: global warming elicits stronger negative emotions and associations with extreme weather, while climate change produces more neutral associations (Leiserowitz et al., 2014). Survey results show that wording effects are moderated by political identity: Republicans tend to be less accepting of global warming than climate change, while Democrats respond more consistently (Schuldt et al., 2011, 2015, 2017; Villar & Krosnick, 2011). Still, findings are mixed, with some studies reporting weak or no framing effects (Dunlap, 2014; Neumann et al., 2022; Soutter & Mõttus, 2020). This suggests that the salience of wording varies across contexts and populations. As such emphasizing the need for research focusing on the impact of differences in framing on survey responses over time.

To interpret temporal risk in risk perception, the study also draws on Construal Level Theory (CLT) (Trope & Liberman, 2010). According to Construal Level Theory, individuals frame their understanding of situations, objects or tasks as concrete or abstract, shaping their willingness to act (Trope & Liberman, 2010). Whether they adopt an abstract or concrete mindset depends on the perceived psychological distance of what they are considering (Trope & Liberman, 2010). Within the context of climate change, hypothetical distance, one dimension of psychological distance, refers to the perceived certainty that climate change is occurring. McDonald et al. (2015) emphasize that because climate change is a complex phenomenon, perceptions of hypothetical distance may encompass both beliefs about its existence and

expectations about the magnitude of its impacts. Despite widespread awareness and concern in the United States, Leiserowitz (2005, 2006) found that climate change is often perceived as a moderate risk affecting distant places and future generations, possibly partially explaining limited behavioral engagement. Conversely, when individuals perceive climate change impacts as proximal, occurring in familiar places, they report heightened concern and demonstrate greater willingness to act (Raymon & Brown, 2011). By combining framing theory with CLT, this study analyzes how wording differences shape reported beliefs and how producers interpret climate risks across personal and generational horizons.

Purpose

This study aimed to examine how survey framing and question wording influence respondents' answers**.** Specifically, the study sought to:

1. Compare and contrast question wording and framing across 2020, 2021 and 2023 Iowa Farm and Rural Life Poll waves
2. Identify changes in producers' climate-related beliefs over time
3. Establish how different framings (climate change vs. global warming) may affect reported beliefs.

Methods

This study utilized data drawn from four waves (2020, 2021, and 2023) of the Iowa Farm Rural Life Poll (IFRLP) to examine how producers' beliefs evolve and how framing may affect reported perceptions. This study employed a mixed methods design, integrating qualitative content analysis with quantitative analysis to provide a comprehensive understanding of producers' beliefs and framing effects. The IFRLP is an annual survey administered by Iowa State University Extension and Outreach to monitor the opinions and practices of Iowa agricultural producers (Arbuckle, 2020). Like most longitudinal surveys, response rates and sample sizes varied across years. In 2020, 1,325 producers were surveyed, yielding 1,059 usable responses (79.9%). The 2021 wave contacted 1,825 producers (1,781 deemed eligible) and received 1,095 usable responses (61.5%). In 2023, the survey was sent to 2,188 producers, with 972 usable responses collected (44.4%). To address objective one, a qualitative content analysis of the 2020, 2021 and 2023 Iowa Farm and Rural Life Poll waves was conducted to identify similarities and differences in framing survey questions related to climate change. A chi-square test of independence was performed to address objective two, which examined changes in producers' climate change beliefs between 2020 and 2023. All statistical analyses were conducted using SPSS Statistics version 29. To address objective three, descriptive statistics were calculated for the 2021 "global warming" items, and response patterns were compared with corresponding "climate change" belief questions from the 2020 and 2023 waves using qualitative content analysis. This comparison enabled exploration of potential framing effects between the two terms.

Results

Question Wording and Framing across 2020, 2021 and 2023 Iowa Farm and Rural Life Poll waves.

The content analysis for 2020, 2021 and 2023 IFRLP instruments revealed notable similarities and differences in the framing and measuring key constructs, particularly beliefs about climate change and global warming. In 2020 and 2023, the identical wording and response options were used to assess climate change beliefs. Respondents were asked to select from five categorical statements: (1) Climate change is occurring and it is caused mostly by natural changes in the environment; (2) Climate change is occurring, and it is caused mostly by human activities; (3) Climate change is occurring, and it is caused more or less equally by natural changes in the environment and human activities; (4) Climate change is not occurring and (5) There is not sufficient evidence to know with certainty and whether climate change is occurring or not.

By contrast, the 2021 wave replaced "climate change" with "global warming" and introduced a more psychological and attitudinal framing. The question stem contextualized the issue by noting recent media attention and defining global warming as the rise in average global temperatures over the past 150 years, with potential future increases that may alter the world's climate. Under the heading "Climate and Agriculture," five items were included. The first was a trichotomous (yes/no/don't know) item asking whether respondents believed global warming is happening. Four subsequent questions assessed personal importance, worry and perceptions of harm using Likert-type scales. Specifically, respondents rated: (1) the personal importance of global warming (from not at all important to extremely important); (2) their level of worry (from not at all worried to very worried); (3) perceived harm to themselves (don't know to a great deal); and (4) perceived harm to future generations (don't know to a great deal). This comparison highlights how the 2020 and 2023 surveys concentrated on categorical belief attribution, while the 2021 survey emphasized attitudinal dimensions such as importance, worry, and perceived harm, thereby potentially shaping responses through framing differences in wording and scale design.

Changes in Climate Change Beliefs between 2020 and 2023

The results of a chi-square test of independence showed that there was a significant shift in climate change beliefs among Iowa producers between 2020 and 2023 (χ^2 (4, N = 3,008) = 50.15, $p < .001$). In 2020, 22.7% believed climate change was caused mostly by natural changes, but this dropped sharply to 21.2% in 2023. Meanwhile, belief in human causes declined from 18.4% in 2020 to 15.1 % in 2023. The proportion believing that it was caused equally by human and natural factors also fell slightly. Those uncertain increased from 16.1 in 2020 to 20% in 2023, and the belief that climate change is not occurring stayed nearly stable from 2.7 to 2.9%. These results suggest a trend towards greater uncertainty and slightly reduced confidence in human causes of climate change among Iowa producers between 2020 and 2023.

Differences in Framing (Climate Change vs. Global Warming) on Reported Beliefs

In 2021, when the term "global warming" was used, 45.5% of respondents believed it was happening, while 32.6% did not, and 21.9% were unsure. By contrast, when asked about climate change in 2020 and 2023, a much larger percentage affirmed that it is occurring. Specifically, when combining responses that attributed climate change to natural causes, human causes, or both, 81.3% in 2022 and 75.3% in 2023 agreed that climate change is occurring, considerably higher than 45.5% who reported belief in global warming in 2021. The proportion denying the phenomenon under the global warming wording (32.6%) was also far greater than under the climate change wording, where only 2.7% in 2020 and 2.9% in 2023 said it was "not occurring."

Similarly, uncertainty was somewhat elevated under the global warming label (21.9%) compared to "not sufficient evidence" responses under climate change, which is 16/1% in 2020 and 19.9% in 2023.

Perceptions of importance and risk in 2021 further illustrate these differences. One third of producers (33.6%) considered global warming to be somewhat important, while 42.9% rated it as "not too" or "not at all" important. Perceived personal risk was low; only 6.6% expected global warming to harm them a great deal, whereas 34.7% believed it would not harm them at all. However, concern for future generations was more pronounced, as 42.8% anticipated moderate to great risk for people in future.

Conclusion/Discussions/ Recommendations/Implications

This study revealed how subtle yet deliberate changes in survey question wording, particularly in response options and terminology, may shape respondents' interpretations and reported beliefs. Although it has not been experimentally tested, a comparative analysis of different waves of the IFRLP survey showed patterns that align with previous research. Even minor modifications in questionnaire design can affect self-reported attitudes and perceptions regarding climate change (Schuldt et al., 2015). Notably, the use of the term "global warming" in 2021 was associated with lower levels of belief compared to when "climate change" was used in other years. The results are not surprising considering that climate change is a controversial and politically charged issue. This finding is consistent with research by Schuldt et al. (2017) and Dunlap (2014), which highlighted the symbolic and partisan significance that such terminology can carry. Given these effects, future research should employ experimental designs to isolate causal framing effects and qualitative methods to explore the interpretive processes respondents use when encountering climate-related terminology. Such approaches would offer deeper insights into the mechanisms through which survey design and word choices influence perception and belief formation.

Additionally, the results indicated a pattern among producers to downplay the personal risks associated with global warming while expressing greater concern for future generations. This pattern reflects a form of psychological distancing consistent with Construal Level Theory (Trope & Liberman, 2010), which suggests that individuals perceive climate impacts as psychologically and temporally distant, thereby reducing the urgency for personal action.

Despite these insights, several limitations should be acknowledged. First, the analysis is based on cross-sectional data from different respondent samples each year, which precludes tracking individual-level changes over time. Second, the 2021 survey used different terminology and measurement scales compared to 2020 and 2023, limiting direct comparability and introducing framing variation. Third, the study is observational in nature, so causal claims about the influence of question wording cannot be made. The absence of qualitative data limits our understanding of the motivations behind changes in beliefs. To overcome these limitations, future studies should employ longitudinal panel designs, controlled experiments, and mixed-methods research. This approach would enhance our findings and help develop more effective communication and engagement strategies with the agricultural sector.

References

Angel, J., Swanston, C., Boustead, B. M., Conlon, K. C., Hall, K. R., Jorns, J. L., Kunkel, K. E., Lemos, M. C., Lofgren, B., Ontl, T. A., Posey, J., Stone, K., Takle, G., & Todey, D. (2018). Midwest. In D. R. Reidmiller, C. W. Avery, D. R. Easterling, K. E. Kunkel, K. L. M. Lewis, T. K. Maycock, & B. C. Stewart (Eds.), *Impacts, risks, and adaptation in the United States: Fourth National Climate Assessment, Volume II* (pp. 872–940). U.S. Global Change Research Program. 10.7930/NCA4.2018.CH21

Arbuckle Jr, J. G., Morton, L. W., & Hobbs, J. (2015). Understanding farmer perspectives on climate change adaptation and mitigation: The roles of trust in sources of climate information, climate change beliefs, and perceived risk. *Environment and Behavior*, *47*(2), 205-234. https://doi.org/10.1177/0013916513503832

Arbuckle, J. G. (2020). *Iowa Farm and Rural Life Poll: 2020 Summary Report*. Ames, IA.

Arbuckle, J. G., Morton, L. W., & Hobbs, J. (2013). Farmer beliefs and concerns about climate change and attitudes toward adaptation and mitigation: Evidence from Iowa. *Climatic Change*, *118*, 551-563. https://doi.org/10.1007/s10584-013-0700-0

Arritt, R. (2016). *Climate change in the Corn Belt* (CSCAP-0193-2016). Cropping Systems Coordinated Agricultural Project (CAP): Climate Change, Mitigation, and Adaptation in Corn-based Cropping Systems. Retrieved from https://isuaamncus122stg.blob.core.windows.net/shop/CSCAP193.pdf

Ba, S. (2001). Establishing online trust through a community responsibility system. *Decision Support Systems*, *31*(3), 323-336. https://doi.org/10.1016/S0167-9236(00)00144-5

Bendorf, J., Baule, W., Licht, M., Reynolds, B., Fillius, D., Vos, R., Glisan, J., Wuestenberg, M., Nowatzke, L., Andresen, J., Wilson, A. B., Todey, D., & Ontl, T. (2024). *Climate change impacts on Iowa agriculture*. United States Department of Agriculture Climate Hubs, and Great Lakes Research Integrated Science Assessment. Retrieved from https://www.climatehubs.usda.gov/sites/default/files/Climate%20Change%20Impacts%20on%20Iowa%20Agriculture_3.pdf

Borrelli, K. A., Roesch-McNally, G. E., Wulfhorst, J. D., Eigenbrode, S. D., Yorgey, G. G., Kruger, C. E., Houston, L. L., Bernacchi, L. A., & Mahler, R. L. (2018). Farmers' trust in sources of production and climate information and their use of technology. *The Journal of Extension*, *56*(3), Article 21. https://doi.org/10.34068/joe.56.03.21

Chatrchyan, A. M., Erlebacher, R. C., Chaopricha, N. T., Chan, J., Tobin, D., & Allred, S. B. (2017). United States agricultural stakeholder views and decisions on climate change. *Wiley Interdisciplinary Reviews: Climate Change*, *8*(5), e469. https://doi.org/10.1002/wcc.469

Chong, D., & Druckman, J. N. (2007). Framing Theory. *Annual Review of Political Science*, *10*(1), 103-126. https://doi.org/10.1146/annurev.polisci.10.072805.103054

D'angelo, P. (2002). News framing as a multiparadigmatic research program: A response to Entman. *Journal of Communication*, *52*(4), 870-888. https://doi.org/10.1111/j.1460-2466.2002.tb02578.x

Demski, C., Capstick, S., Pidgeon, N., Sposato, R. G., & Spence, A. (2017). Experience of extreme weather affects climate change mitigation and adaptation responses. *Climatic Change*, *140*, 149-164. 10.1007/s10584-016-1837-4

Dietz, T., Fitzgerald, A., & Shwom, R. (2005). Environmental values. *Annual Review of Environment and Resources*, *30*(1), 335-372. https://doi.org/10.1146/annurev.energy.30.050504.144444

Dunlap, R. E. (2014, April 22). *Global warming or climate change: Is there a difference?* Gallup. *Retrieved from https://news.gallup.com/poll/168617/global-warming-climate-change-difference.aspx*

Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication*, *43*(4), 51-58. https://doi.org/10.1111/j.1460-2466.1993.tb01304.x

Gifford, R., & Comeau, L. A. (2011). Message framing influences perceived climate change competence, engagement, and behavioral intentions. *Global Environmental Change*, *21*(4), 1301-1307. https://doi.org/10.1016/j.gloenvcha.2011.06.004

Goffman, E. (1974). *Frame analysis: An essay on the organization of experience.* Harvard University Press.

Jaspal, R., Nerlich, B., & Van Vuuren, K. (2016). Embracing and resisting climate identities in the Australian press: Sceptics, scientists and politics. *Public Understanding of Science*, *25*(7), 807-824. https://doi.org/10.1177/0963662515584287

Jiang, H., Qiang, M., Zhang, D., Wen, Q., Xia, B., & An, N. (2018). Climate change communication in an online q&a community: A case study of quora. *Sustainability*, *10*(5), 1509. https://doi.org/10.3390/su10051509

Lakoff, G., & Johnson, M. (1981). *Metaphors we live by*. University of Chicago Press.

Leiserowitz, A. (2006). Climate change risk perception and policy preferences: The role of affect, imagery, and values. *Climatic Change*, *77*(1), 45-72. https://doi.org/10.1007/s10584-006-9059-9

Leiserowitz, A. A. (2005). American risk perceptions: Is climate change dangerous?. *Risk Analysis: An International Journal*, *25*(6), 1433-1442. https://doi.org/10.1111/j.1540-6261.2005.00690.x

Leiserowitz, A., Feinberg, G., Rosenthal, S., Smith, N., Anderson A., Roser-Renouf, C. & Maibach, E. (2014, May). *What's in a name? global warming vs. climate change.* Yale University and George Mason University.

Mase, A. S., Gramig, B. M., & Prokopy, L. S. (2017). Climate change beliefs, risk perceptions, and adaptation behavior among Midwestern US crop farmers. *Climate Risk Management*, *15*, 8-17. https://doi.org/10.1016/j.crm.2016.11.004

McDonald, R. I., Chai, H. Y., & Newell, B. R. (2015). Personal experience and the 'psychological distance' of climate change: An integrative review. *Journal of Environmental Psychology*, *44*, 109-118. https://doi.org/10.1016/j.jenvp.2015.10.003

Meyerson, D., Weick, K.E. and Kramer, R.M. (1996). Swift Trust and Temporary groups. In R. M. Kramer & T. R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research* (pp.166-195). Sage. http://dx.doi.org/10.4135/9781452243610.n9

Morton, L. W., Roesch-McNally, G., & Wilke, A. K. (2017). Upper Midwest farmer perceptions: Too much uncertainty about impacts of climate change to justify changing current agricultural practices. *Journal of Soil and Water Conservation*, *72*(3), 215-225. https://doi.org/10.2489/jswc.72.3.215

Moy, P., Tewksbury, D., & Rinke, E. M. (2016). Agenda-Setting, Priming, and Framing. In K. B. Jensen, E. W. Rothenbuhler, J. D. Pooley, & R. T. Craig (Eds.), *The international encyclopedia of communication theory and philosophy* (pp. 1–13). John Wiley & Sons, Inc. https://doi.org/10.1002/9781118766804.wbiect266

Nisbet, M. C. (2009). Communicating climate change: Why frames matter for public engagement. *Environment: Science and Policy for Sustainable Development*, *51*(2), 12-23. https://doi.org/10.3200/ENVT.51.2.12-23

Ranjan, P., Church, S. P., Floress, K., & Prokopy, L. S. (2019). Synthesizing conservation motivations and barriers: what have we learned from qualitative studies of farmers' behaviors in the United States?. *Society & Natural Resources*, *32*(11), 1171-1199. 10.1080/08941920.2019.1648710

Raymond, C. M., & Brown, G. (2011). Assessing spatial associations between perceptions of landscape value and climate change risk for use in climate change planning. *Climatic Change*, *104*(3), 653-678. https://doi.org/10.1007/s10584-010-9806-9

Reser, J. P., Bradley, G. L., & Ellul, M. C. (2014). Encountering climate change:'seeing'is more than 'believing'. *Wiley Interdisciplinary Reviews: Climate Change*, *5*(4), 521-537. https://doi.org/10.1002/wcc.286

Schuldt, J. P., & Roh, S. (2014). Media frames and cognitive accessibility: What do "global warming" and "climate change" evoke in partisan minds?. *Environmental Communication*, *8*(4), 529-548. https://doi.org/10.1080/17524032.2014.909510

Schuldt, J. P., Enns, P. K., & Cavaliere, V. (2017). Does the label really matter? Evidence that the US public continues to doubt "global warming" more than "climate change". *Climatic Change*, *143*, 271-280. https://doi.org/10.1007/s10584-017-1993-1

Schuldt, J. P., Konrath, S. H., & Schwarz, N. (2011). "Global warming" or "climate change"? Whether the planet is warming depends on question wording. *Public Opinion Quarterly*, *75*(1), 115-124. https://doi.org/10.1093/poq/nfq073

Schuldt, J. P., Roh, S., & Schwarz, N. (2015). Questionnaire design effects in climate change surveys: Implications for the partisan divide. *The ANNALS of the American Academy of Political and Social Science*, *658*(1), 67-85. 10.1177/0002716214555066

Shi, W., Chen, C., Xiong, J., & Fu, H. (2019). What framework promotes saliency of climate change issues on online public agenda: A quantitative study of online knowledge community Quora. *Sustainability*, *11*(6), 1619. https://doi.org/10.3390/su11061619

Smith, N., & Joffe, H. (2013). How the public engages with global warming: A social representations approach. *Public Understanding of Science*, *22*(1), 16-32. 10.1177/0963662512440913

Sonnett, J. (2010). Climates of risk: A field analysis of global climate change in US media discourse, 1997-2004. *Public Understanding of Science*, *19*(6), 698-716. 10.1177/0963662509346368

Tewksbury, D. H. (2015). News framing. In P. Moy (Ed.), *Oxford bibliographies in communication*. Oxford University Press.

Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, *117*(2), 440. 10.1037/a0018963.

U.S. Global Change Research Program (USGCRP). (2018). *Impacts, risks, and adaptation in the United States: Fourth National Climate Assessment, Volume II* (D. R.

Van der Linden, S., Maibach, E., & Leiserowitz, A. (2015). Improving public engagement with climate change: Five "best practice" insights from psychological science. *Perspectives on Psychological Science*, *10*(6), 758-763. 10.1177/1745691615598516

Villar, A., & Krosnick, J. A. (2011). Global warming vs. climate change, taxes vs. prices: Does word choice matter?. *Climatic Change*, *105*(1), 1-12. 10.1007/s10584-010-9882-x

Whitmarsh, L. (2009). What's in a name? Commonalities and differences in public understanding of "climate change" and "global warming". *Public Understanding of Science*, *18*(4), 401-420. https://doi.org/10.1177/0963662506073088

Zaval, L., Keenan, E. A., Johnson, E. J., & Weber, E. U. (2014). How warm days increase belief in global warming. *Nature Climate Change*, *4*(2), 143-147. 10.1038/nclimate2093