

# Climate as Comedy: The Effects of Satirical Television News on Climate Change Perceptions

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## **Abstract**

Two satirical television news programs, *The Daily Show* and *The Colbert Report*, cover climate change in ways that affirm the existence of global warming. This study uses data from an experiment ( $N = 424$ ) to test whether exposure to these programs' coverage can influence viewers' certainty that global warming is happening. It also examines whether viewers' political beliefs predict their interpretations of the programs' messages about climate change, whether such interpretations are related to viewers' climate change perceptions, and whether the effects of the programs vary depending on viewers' political beliefs.

## **Keywords**

climate change, mass media, public perception of science, quantitative analysis

On October 26, 2011, *The Daily Show With Jon Stewart* presented a segment on climate change in which Stewart, the “anchor” of the satirical television news program (which airs on the Comedy Central cable network), described a new study of global warming:

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If only an impartial arbiter could come in—remove the warming debate’s political implications and just examine the science. And if only that person could be funded in large part by two titans of a seldom-heard constituency of the global warming debate: the oil industry. Yes, Richard Mueller, the Berkeley physics professor who took on the challenge of reexamining climate data had, as his biggest private funder, the Koch brothers. . . . Oil billionaires and Tea Party heartthrobs Charles and David Koch. So you see where this “research” is going. Sure enough, last week, skeptical Doc Mueller announced his results in an op-ed in the *Wall Street Journal*.

Stewart went on to describe Mueller’s results:

Whoa, global warming is real. Did not see that coming. Yes, the study, funded by the Koch brothers, confirms that the original research was actually correct. The earth is getting warmer—or, judging by this graphic, getting more embarrassed.

*The Daily Show*’s companion program, *The Colbert Report With Stephen Colbert* (which also airs on Comedy Central), addressed the same topic in a January 28, 2013, segment. Colbert, performing in his usual ironic persona of a conservative talk show host, began by proclaiming, “Folks, last week President Obama cynically used the inaugural address to push his radical prosurvival agenda.” He then discussed Mueller’s research:

Folks, I didn’t think this part of his speech would get any traction because there’s no national consensus on climate change. It’s like if JFK announced the Apollo program, but half the country denied the moon exists. But . . . even Koch brothers—funded climate change skeptic and hairbrush denier Richard Mueller has done a 180, now stating, “Global warming is real, and humans are almost entirely the cause.” Now the only thing receding faster than the glaciers is Doctor Mueller’s funding.

Thus, Colbert presented the same conclusion as did Stewart: Climate change is occurring.

Both segments reflect a broader tendency on the part of these programs to not only cover the topic of global warming but also affirm the evidence for climate change and rebut climate change skeptics (Feldman, 2013). In doing so, *The Daily Show* and *The Colbert Report* address a prominent scientific and environmental issue on which traditional U.S. news coverage often diverges from the scientific community’s conclusions. Although an overwhelming majority of climate scientists agree that climate change is occurring and that humans have contributed to such change (Intergovernmental Panel on Climate Change, 2013), U.S. news coverage of climate change frequently

“balances” the scientific consensus with views from climate change skeptics (Antilla, 2005; Boykoff, 2007, 2008, 2011; Boykoff & Boykoff, 2004; Feldman, Maibach, Roser-Renouf, & Leiserowitz, 2012). Moreover, polls show that around a quarter of the U.S. public disagrees with this consensus (Gallup, 2014; Pew Research Center, 2014b). Thus, satirical television news coverage may offer counterpoints to climate change skepticism in public discourse and public opinion.

With this in mind, the present study considers the potential for satirical television news programs such as *The Daily Show* and *The Colbert Report* to shape audience members’ perceptions of climate change. To develop a theoretical framework for doing so, it builds on previous research regarding news media effects on perceptions of climate change and satirical television news effects on public opinion. It then uses data from an experiment to test whether exposure to satirical television news coverage of climate change can influence viewers’ perceptions. In addition, it examines whether viewers’ political beliefs predict their interpretations of the programs’ messages about climate change, whether such interpretations are related to viewers’ climate change perceptions, and whether the effects of the programs vary depending on viewers’ political beliefs.

## **The Nature and Effects of Traditional News Coverage of Climate Change**

Research shows that traditional U.S. news coverage of climate change has often diverged substantially from the scientific consensus that such change is occurring and that humans have contributed to it. For example, Antilla (2005) found that U.S. newspapers often presented climate change in terms of debate, controversy, or uncertainty and relied on climate skeptics with fossil fuel industry ties as sources. Similarly, Boykoff and Boykoff (2004) found that “prestige” U.S. newspapers frequently presented coverage that balanced the scientific consensus with the views of climate change skeptics, though a follow-up study revealed a decline in such balancing (Boykoff, 2007). Looking at U.S. television news, Boykoff (2008) found that a large majority of segments provided “balanced” coverage regarding anthropogenic contributions to climate change. Journalistic norms and values—particularly those of objectivity and balance—help explain why U.S. news coverage does not fully reflect the scientific consensus on climate change (Boykoff, 2007, 2008, 2011; Boykoff & Boykoff, 2004).

At the same time, coverage of climate change can differ substantially across media outlets. Feldman et al. (2012) found that one of the three leading U.S. cable television news networks, Fox News Channel, presented dismissive coverage of climate change much more frequently than did the other two,

CNN and MSNBC. This pattern reflects a broader tendency of Fox News to cover issues in ways that reflect conservative and Republican positions (Jamieson & Cappella, 2008). In the United States, public discourse surrounding climate change is polarized along political lines, with conservative and Republican leaders signaling greater skepticism about climate change while liberal and Democratic leaders signal greater belief in climate change (McCright & Dunlap, 2011). Feldman et al.'s (2012) results suggest that cable television news coverage of climate change echoes these broader political divisions.

Members of the public, in turn, tend to rely on the media for information about scientific topics (Nisbet et al., 2002). Moreover, they often use cues (i.e., signals from opinion leaders) and frames (i.e., interpretive structures) in media messages to form evaluations about science-related issues (Brossard & Nisbet, 2007; Scheufele & Lewenstein, 2005). As a result, the ways in which traditional news media cover climate change can influence public perceptions. For example, experimental research has shown that climate change perceptions can differ depending on whether participants read a story about the topic that includes context or one that includes controversy (Corbett & Durfee, 2004), whether they read a story framing the topic in individualistic or generalized terms (Hart, 2011), and whether they watch a story that includes an interview with a mainstream scientist or an interview with both a mainstream scientist and a skeptic (Malka, Krosnick, Debell, Pasek, & Schneider, 2009). Recent research also suggests that exposure to different media outlets can influence climate change perceptions in different ways. In particular, the aforementioned study by Feldman et al. (2012) found that viewing Fox News was negatively associated with acceptance of climate change, whereas viewing CNN and MSNBC was positively associated with such acceptance (see also Hmielowski, Feldman, Myers, Leiserowitz, & Maibach, 2014; Krosnick & MacInnis, 2010). Thus, cable news coverage may reinforce the substantial levels of ideological and partisan polarization in public perceptions of climate change (see McCright & Dunlap, 2011).

## **Satirical Television News Coverage of Climate Change and Its Effects**

Although most studies of media effects on climate change perceptions have focused on traditional news outlets, another line of research raises the possibility that exposure to satirical television news programs such as *The Daily Show* and *The Colbert Report* will also influence such perceptions. To begin with, a growing body of literature demonstrates that these programs cover public affairs in ways that have the potential to inform and shape public

understandings (Baym, 2005, 2007). For example, Brewer and Marquardt (2007) found that *The Daily Show* presented substantial levels of policy coverage, while Fox, Koloen, and Sahin (2007) found that *The Daily Show* and broadcast network newscasts presented similar levels of substance in their coverage of election campaigns. In addition to covering politics, *The Daily Show* and *The Colbert Report* frequently cover scientific topics ranging from evolution to space exploration (Feldman, Leiserowitz, & Maibach, 2011). A Project for Excellence in Journalism (Pew Research Center, 2008) study found that *The Daily Show* devoted 2.6% of its “news hole” to science and technology—a modest percentage, perhaps, but more than twice the percentage for the traditional press.

The same study showed that *The Daily Show* also devoted twice as much of its coverage to global warming than did the traditional press. Building on this finding, Feldman (2013) conducted a content analysis of how *The Daily Show* and *The Colbert Report* portray global warming in their satirical news segments and guest interviews. She analyzed *Daily Show* coverage from 1999 (when Stewart took over as the show’s host) to 2012 and *Colbert Report* coverage from 2005 (when the show launched) to 2012. The results indicated that a sizable majority of segments about climate change on both programs affirmed the reality of global warming: Fully 70% of 81 segments on *The Daily Show* and 64% of 102 segments on *The Colbert Report* did so. Furthermore, the interview segments frequently featured guests who affirmed the existence of climate change and seldom featured climate change skeptics.

These findings suggest the potential for the programs to shape audience members’ understandings of climate change. To be sure, some *Daily Show* and *Colbert Report* viewers may already be exposed to other messages affirming the existence of climate change—for example, by watching the coverage typical of CNN and MSNBC. In addition to being disproportionately young, educated, and liberal, viewers of satirical news programs are more likely than other members of the public to follow public affairs and to watch cable news (Pew Research Center, 2014a; Young & Tisinger, 2006). However, the audiences for *The Daily Show* and *The Colbert Report* are far from monolithic. Viewers watch them not only—or even primarily—to be informed or have their beliefs reinforced but also to be entertained and amused (Young, 2013). By packaging information in an entertaining way (see Baum, 2003), satirical news programs therefore offer an alternative route by which their viewers—including those who do not consume much traditional news—can acquire information about topics such as climate change.

Indeed, research shows that exposure to satirical television news programs such as *The Daily Show* and *The Colbert Report* can increase public knowledge (Brewer & Cao, 2006; Cao, 2008; Hardy, Gottfried, Winneg, & Jamieson,

2014; Hollander, 2005; Xenos & Becker, 2009; Young & Hoffman, 2012) and attention to public affairs (Cao, 2010). Of particular relevance for the present study, Feldman et al. (2011) concluded that *The Daily Show* and *The Colbert Report* can serve as gateways to scientific engagement. Analyzing national survey data, they found that consumption of these satirical television news programs was associated with greater attention to news about science and technology, news about the environment, and information about global warming, even after controlling for a host of other factors.

The present study extends this line of research to examine the potential effects of *The Daily Show* and *The Colbert Report* on perceptions of climate change. It is important to understand such effects given that satirical television news programs reach sizable audiences (Cao, 2008), including viewers who do not follow more traditional news outlets, and that climate change perceptions can carry distinctive and substantial consequences. On the latter point, research has found that these perceptions predict behavioral intentions regarding individual voluntary actions and public policy proposals to mitigate climate change (e.g., Bord, O'Connor, & Fisher, 2000). The analyses here focus on certainty that global warming is happening, a key component of public perceptions regarding climate change (Feldman et al., 2012).

To date, no research has tested the impact of satirical television news on perceptions of climate change. However, research does demonstrate that exposure to *The Daily Show* or *The Colbert Report* can influence opinions about a range of other topics, including attitudes toward political candidates (Baumgartner & Morris, 2006, 2008; Morris, 2009), the news media (Baumgartner & Morris, 2006), and policy issues (Hardy et al., 2014; LaMarre, 2013). Thus, the present study hypothesizes the following:

**Hypothesis 1A:** Compared to those not exposed to any coverage of climate change, viewers exposed to *Daily Show* coverage affirming the existence of climate change will be more certain that global warming is occurring.

**Hypothesis 1B:** Compared to those not exposed to any coverage of climate change, viewers exposed to *Colbert Report* coverage affirming the existence of climate change will be more certain that global warming is occurring.

In short, viewing satirical television news coverage that reflects the general patterns observed by Feldman (2013) should lead to greater certainty that climate change is taking place.

Yet the effects of satirical television news coverage may depend on the ways in which audience members interpret it. In particular, the contrast between the explicit and implicit messages in *The Colbert Report's* ironic humor creates ambiguities that allow for multiple audience interpretations (Baumgartner & Morris, 2008). According to LaMarre, Landreville, and

Beam (2009, p. 216; see also Baym, 2005), Stewart typically “aids viewer interpretation by offering himself as an unambiguous source and providing external cues.” In contrast, Colbert’s “deadpan satire and commitment to character do not provide viewers with the external cues or source recognition that Stewart offers” (LaMarre et al., 2009, p. 216; see also Baym, 2007; Jones, 2010). As a result, audience members may engage in *biased processing* of Colbert’s messages by interpreting them in ways that are consistent with their own prior beliefs, including their political ideologies. In keeping with this, LaMarre et al. (2009) found that conservative viewers were more likely than liberal viewers to perceive Colbert as genuinely meaning what he says, holding conservative views, and only pretending to be joking.

Colbert’s ironic approach extends to his commentary on climate change. As Baym (2009, p.136; see also Feldman, 2013) observes, he “mimics those who continue to insist that global warming is a myth” in satirizing conservative skepticism about climate change. In light of this, as well as the associations between conservatism and climate change skepticism in both public discourse (McCright & Dunlap, 2000, 2003) and public opinion (Feldman et al., 2012; McCright & Dunlap, 2011), the present study tests whether viewers engage in biased ideological processing of Colbert’s messages about climate change:

**Hypothesis 2:** Compared to liberal viewers, conservative viewers will be less likely to perceive Colbert as believing in climate change.

Given that Stewart’s messages—including his messages about climate change (Feldman, 2013)—tend to be less ambiguous than Colbert’s, one would expect viewers’ interpretations of the former to vary less than their interpretations of the latter. Thus, there is not as strong a basis for expecting viewers to engage in biased ideological processing of *The Daily Show*’s global warming coverage. Here, then, the present study addresses the following research question:

**Research Question 1:** Compared to liberal viewers, will conservative viewers be less likely to perceive Stewart as believing in climate change?

The present study also extends LaMarre et al.’s (2009) research by testing whether audience members’ interpretations of satirical news messages are, in turn, related to their views on the topic of those messages—in this case, climate change. Specifically, it tests the following hypotheses:

**Hypothesis 3A:** Among those viewing *Daily Show* coverage, perceptions that Stewart believes in climate change will be associated with certainty that global warming is occurring.



**Hypothesis 3B:** Among those viewing *Colbert Report* coverage, perceptions that Colbert believes in climate change will be associated with certainty that global warming is occurring.

In sum, viewers' perceptions of the hosts' positions should predict their own perceptions of climate change.

In addition, the present study tests the possibility that viewers' political beliefs will moderate the effects of satirical climate change coverage on certainty that global warming is happening. In their study, Feldman et al. (2012) suggested that viewers might engage in biased processing whereby their political beliefs would moderate the effects of cable news use on global warming acceptance. However, the authors found that the effects of not only Fox News use (consistent with expectations assuming biased processing) but also CNN and MSNBC use (contrary to expectations) on such acceptance were greater among Republicans than among Democrats. Given these mixed results, the present study proposes research questions here:

**Research Question 2A:** Will political ideology moderate the effects of exposure to *Daily Show* climate change coverage on certainty that global warming is happening?

**Research Question 2B:** Will political ideology moderate the effects of exposure to *Colbert Report* climate change coverage on certainty that global warming is happening?

## Method

The data for this study came from a posttest-only experiment conducted from April 18 to May 9, 2013. The experiment was conducted online using Qualtrics. The method of recruiting participants followed an approach used by Kramer and Hess (2002), Quick (2009), and Brewer (2013). Students in a communication methods course at a public university in a Mid-Atlantic state were each responsible for recruiting 20 student participants (some recruited more). In all, 424 participants completed the study.<sup>1</sup> Of these, 64% were women and 36% were men. Almost all (>99%) were between the 18 and 24 years old. In terms of race and ethnicity, 90% self-identified as White, 5% as Asian/Pacific Islander, 4% as Hispanic, 3% as African American, and 1% as other (participants were allowed to select multiple categories). The nature of the sample raises the issue of how generalizable the results may be—a point the Discussion section revisits.



## Treatments

Participants were told that they would be asked to view a 1-minute video. To help misdirect them from the true purpose of the study, the instructions included a statement that they would be asked a series of questions about the video. Each participant was then randomly assigned to one of three conditions. Those in the first condition ( $N = 125$ ) viewed a video about an unrelated topic (a clip from the television program *Finding Bigfoot*) and served as the control condition.<sup>2</sup> Participants in the second condition ( $N = 125$ ) viewed a clip from the October 26, 2011, segment of *The Daily Show* described in the introduction. This clip showed Stewart discussing how “skeptical” Robert Mueller had conducted research—with “the Koch brothers” as “his biggest private funder”—concluding that “global warming is real.”<sup>3</sup> Participants in the third condition ( $N = 174$ ) viewed a clip from the January 28, 2013, segment of *The Colbert Report* described in the introduction.<sup>4</sup> This clip covered the much of the same information as the clip from *The Daily Show*: Like Stewart, Colbert discussed how “climate change skeptic” Mueller had conducted “Koch brothers–funded research” concluding that “global warming is real.”<sup>5</sup> The *Daily Show* and *Colbert Report* clips were identical in length, as well. However, the style of humor differed in ways reflecting the broader patterns identified by previous research (Feldman, 2013; LaMarre et al., 2009). Stewart delivered a straightforward, if sarcastic, commentary, using facial expressions, gestures such as “air quotations,” and other cues to convey his true meaning. In contrast, Colbert maintained his ironic persona of a conservative talk show host: In a deadpan manner, he stated that “there is no national consensus on climate change” and expressed “shock” at evidence to the contrary. As Polk, Young, and Holbert (2009) observe, “Sarcasm possesses clear cues and marks an obvious target, whereas . . . irony’s humorous effect is derived by the cognitive reconstruction of the intended meaning of a statement” (p. 204).

## Posttest

The posttest included questions on a variety of topics, some of which were intended to misdirect participants from the study’s purposes (including questions related to the topic of the control video). Measures for the variables of interest were as follows:

**Climate Change Perceptions.** The measure for certainty that global warming is occurring was based on an item used by Feldman et al. (2012) asking participants to indicate, on a 9-point scale, “the answer that best reflects your views

about whether global warming is happening.” The ends of the scale were labeled “Extremely sure that global warming is not happening” (coded as 1) and “Extremely sure that global warming is happening” (coded as 9; underlining in the original).

*Perceptions of Hosts’ Beliefs About Climate Change.* Those assigned to view the *Daily Show* video were asked, “Which of the following best describes what Jon Stewart of *The Daily Show* thinks about global warming?” Response options included, “He believes that global warming is happening,” “He believes that global warming is not happening,” and “It is unclear what he believes about global warming.”<sup>6</sup> Participants assigned to view the *Colbert Report* video were asked a parallel item about “what Stephen Colbert of *The Colbert Report* thinks about global warming.”

*Political Ideology.* All respondents were asked, “In general, how would you describe your political views?” Of the respondents, 24% identified as conservative, 36% as moderate, and 39% as liberal (1% did not answer).<sup>7</sup>

*Other Variables.* The posttest included several other measures used in the analyses described below. One set of questions asked participants to rate the video they viewed on a series of dimensions, including how funny, amusing, serious, and informative it was. Response options ranged from “not at all” to “a great deal.” Another set of questions measured self-reported levels of “interest in information” about politics, the environment, and global warming. Response options ranged from “not at all” to “a great deal.” Interest in politics was treated as a single-item measure; interest in the environment and global warming were strongly correlated with one another and, thus, were averaged to create an index. Yet another set of questions asked participants to indicate how often they watched various television outlets, with response options for each item ranging from “never” to “every day.” These outlets included “The national nightly network news on CBS, ABC, or NBC”; “CNN or MSNBC” (measured jointly, following Feldman et al., 2012); Fox News Channel; *The Daily Show*; and *The Colbert Report*.

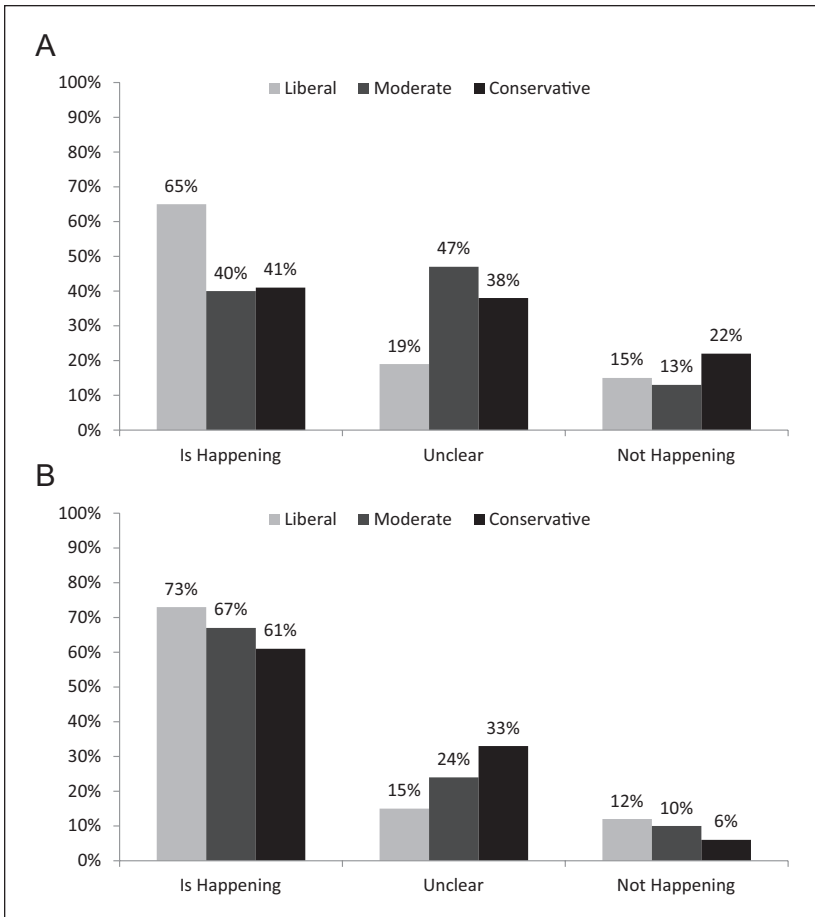
## Results

The first set of analyses tested whether exposure to *Daily Show* and *Colbert Report* coverage affirming the existence of climate change influenced viewers’ climate change perceptions. Certainty that global warming is happening differed significantly across conditions in a one-way analysis of variance (ANOVA),  $F(2, 418) = 3.88; p < .05$ , indicating that the experimental manipulation shaped

such certainty.<sup>8</sup> Planned comparisons addressed the specific hypotheses here.<sup>9</sup> Consistent with Hypothesis 1A, certainty among participants who viewed the clip from *The Daily Show* ( $M = 6.91$ ,  $SD = 1.58$ ) was significantly greater ( $t = 2.41$ ,  $p < .05$ ) than certainty among control participants ( $M = 6.32$ ,  $SD = 2.22$ ). Consistent with Hypothesis 1B, certainty among participants who viewed the clip from *The Colbert Report* ( $M = 6.83$ ,  $SD = 1.70$ ) was also greater ( $t = 2.15$ ,  $p < .05$ ) than certainty among control participants. In substantive terms, certainty that global warming is happening was around half a point greater (.59 for the *Daily Show* clip and .51 for the *Colbert Report* clip, on a 1-9 scale) among those who viewed either of the treatment videos than among those in the control condition. As captured by Cohen's  $d$ , the effect size for the *Daily Show* treatment relative to the control was 0.30, and the effect size for the *Colbert Report* treatment relative to the control was 0.26; thus, the magnitude of each effect fell toward the small end of the range between the small (0.2) and medium (0.5) thresholds proposed by Cohen (1988). There was no significant difference in certainty between those who viewed the *Daily Show* clip and those who viewed the *Colbert Report* clip ( $t = .08$ ,  $p = \text{n.s.}$ ).

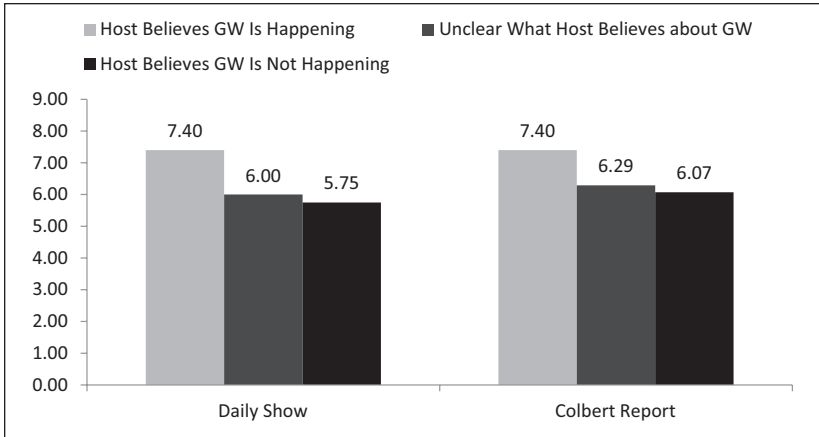
In each of the treatment conditions, a majority of participants perceived the satirical host they viewed as believing in global warming. Among the participants who viewed the *Daily Show* clip, 67% said that Stewart believes global warming is happening, 23% said that it is unclear what he believes about global warming, and 10% said that he believes global warming is not happening. Among those who viewed the *Colbert Report* clip, 52% said that Colbert believes global warming is happening, 32% said that it is unclear what he believes about global warming, and 16% said that he believes global warming is not happening. However, the proportion of participants viewing the *Daily Show* clip who perceived Stewart as believing in global warming was significantly greater than the proportion of participants viewing the *Colbert Report* clip who perceived Colbert as believing in global warming ( $z = 2.63$ ,  $p < .01$ ).

Among participants who viewed the *Colbert Report* clip, liberals were significantly more likely than conservatives to perceive Colbert as believing that global warming is happening ( $\chi^2 = 14.57$ , degrees of freedom = 4,  $p < .01$ ; see Figure 1A). Thus, the results here yielded evidence that participants engaged in biased ideological processing of Colbert's messages, interpreting them in ways that reflected their own political beliefs (Hypothesis 2). In contrast, no significant relationship emerged between ideology and perceptions of Stewart's beliefs about global warming among participants who viewed the *Daily Show* clip ( $\chi^2 = 3.91$ , degrees of freedom = 4,  $p = \text{n.s.}$ ; see Figure 1B). Thus, the results yielded no evidence of biased ideological processing of Stewart's messages (Research Question 1).<sup>10</sup>



**Figure 1.** (A) Perceptions of Colbert's beliefs on global warming, by participant's ideology; (B) Perceptions of Stewart's beliefs on global warming, by participant's ideology.

Perceptions of the hosts' beliefs about global warming, in turn, were related to participants' own certainty about global warming (see Figure 2). Among participants in the *Daily Show* condition, certainty that global warming is happening differed significantly across perceptions of Stewart's beliefs (in a one-way ANOVA),  $F(2, 121) = 14.60, p < .01$ . Similarly, among participants in the *Colbert Report* condition, certainty that global warming is happening differed significantly across perceptions of Colbert's beliefs (in a one-way



**Figure 2.** Certainty that global warming is happening, by perceptions of hosts' beliefs.

ANOVA),  $F(2, 170) = 11.97, p < .01$ ). Consistent with Hypothesis 3A, participants who saw the *Daily Show* clip and perceived Stewart as believing in global warming reported greater certainty ( $M = 7.40$ ) than those who were unsure what he believed about global warming ( $M = 6.00$ ) or perceived him as not believing in global warming ( $M = 5.75$ ). Consistent with Hypothesis 3B, participants who saw the *Colbert Report* clip and perceived Colbert as believing in climate change reported greater certainty ( $M = 7.40$ ) than those who were unsure what he believed about global warming ( $M = 6.29$ ) or perceived him as not believing in global warming ( $M = 6.07$ ).<sup>11</sup>

The analyses yielded no evidence that viewers' own political beliefs moderated the effects of the treatments on certainty that global warming is happening. In a two-way ANOVA testing the effects of condition and ideology, main effects emerged for both condition,  $F(2, 419) = 4.41, p < .05$ , and ideology,  $F(2, 419) = 25.00, p < .01$ . However, the interaction between the two was not statistically significant,  $F(4, 419) = .96; p = \text{n.s.}$  Put another way, the effects of the treatments were not significantly stronger among liberals than among conservatives.

## Discussion

The findings of this study show that exposure to satirical television news coverage of climate change can shape viewers' climate change perceptions. Compared to experimental participants who did not view any climate change coverage, those who viewed *Daily Show* coverage affirming the existence of

global warming expressed more certainty that such warming is happening. Similarly, participants who viewed *Colbert Report* coverage affirming the existence of global warming expressed more certainty that global warming is happening. These results dovetail with, while also extending, previous research showing that satirical television news can shape public opinion about other public affairs topics (Baumgartner & Morris, 2006, 2008; Hardy et al., 2014; LaMarre, 2013; Morris, 2009) as well as attention to scientific and environmental issues, including climate change (Feldman et al., 2011).

The present study's findings also suggest that viewers can engage in biased ideological processing of Colbert's messages about climate change. Compared to liberal viewers, conservative viewers of the *Colbert Report's* coverage were more likely to perceive Colbert as believing that climate change is not happening. A plausible interpretation of this pattern is that viewers tended to interpret his ambiguous messages in ways that reflected their own ideological orientations (LaMarre et al., 2009). Given that conservatism is typically associated with greater climate change skepticism (including in the sample of participants for this study), some conservative viewers may have interpreted Colbert as being serious when he stated that "there is no national consensus on climate change." Liberal viewers, on the other hand, were presumably more likely to interpret Colbert's comments as ironic.

The results yielded no evidence that viewers engaged in biased ideological processing of Stewart's messages about climate change, which also appeared to be less ambiguous to viewers. One potential interpretation of this result, building on the theoretical framework developed here, is that Colbert's ironic style of humor allowed for greater biased ideological processing than did Stewart's more sarcastic style. Another possibility is that the contrast here reflects some other dimension(s) of how participants perceived the two hosts and their humor. However, participants did not differ significantly across the *Daily Show* and *Colbert Report* conditions in how serious or informative they rated the clip they viewed as being, nor did they differ significantly across these two conditions in how amusing or funny they rated the clip as being. Thus, the differences in interpretations of the hosts' beliefs do not appear to reflect any differences in what could be termed their *imputed seriousness*.

Among those who viewed either of the satirical clips, perceptions of the hosts' beliefs about global warming were also associated with certainty that global warming is happening. Such certainty was greater among those who perceived Stewart as believing in global warming than among those who perceived him as disbelieving in global warming or were unsure what he believed. Likewise, it was greater among those who perceived Colbert as believing in global warming than among those who perceived him as disbelieving in global warming or were unsure what he believed. One potential

explanation here is that viewers actively used their preexisting views to interpret the programs' scientific messages, rather than passively accepting such messages (see Nisbet & Mooney, 2007; Nisbet & Scheufele, 2007). However, the effects of the clips on certainty that global warming is happening did not vary across viewers' political beliefs. Thus, we find evidence that viewers' interpretations of the programs can be ideologically biased (in the case of Colbert) and that these interpretations can be related to certainty that global warming is happening (in the cases of both Stewart and Colbert), but we find no evidence of ideologically biased effects for the programs.

Although the present study's findings demonstrate that watching satirical television news programs *can* shape audience members' climate change perceptions, they do not indicate that use of such programs necessarily *will* do so. Additional evidence on this point comes from a regression analysis (not shown) predicting certainty that global warming is happening, where the model included dummy variables capturing exposure to the treatments (one for the *Daily Show* condition and one for the *Colbert Report* condition, with the control condition as the excluded baseline), sex, ideology, interest in politics, interest in the environment/global warming, and self-reported prior use of Fox News, CNN/MSNBC, broadcast news, *The Daily Show*, and *The Colbert Report*. In this analysis, neither *prior use* of *The Daily Show* nor *prior use* of *The Colbert Report* predicted certainty that global warming is happening (in contrast to the significant coefficients for the treatments, reflecting the effects of *experimenter-controlled exposure* to *The Daily Show* and *The Colbert Report*).<sup>12</sup>

To some extent, the absence of significant relationships here may reflect the limitations of self-reports as measures of media use (e.g., Prior, 2009). However, it may also reflect the extent to which the programs covered—or did not cover—climate change in the time period preceding the study (April–May, 2013). Feldman (2013) found that the amount of coverage that *The Daily Show* and *The Colbert Report* devoted to climate change varied substantially over time, peaking in 2007 and then declining to considerably lower levels in 2012. Furthermore, a search on the programs' websites for videos about “climate change” or “global warming” revealed relatively few videos from the first 4 months of 2013. Thus, regular viewers of *The Daily Show* and *The Colbert Report* may have seen little climate change coverage on these programs in the months immediately prior to the study. If so, then there would have been little opportunity for the programs to influence audience members' climate change perceptions. In contrast, Feldman et al.'s (2011) study, which found a cross-sectional relationship between satirical television news use and attention to global warming information, used data from 2008—a time when the programs were covering the issue more extensively.



It is important to note several potential limitations of the study. To begin with, the tests for biased ideological processing used correlational analyses, as did the analyses of the relationships between viewers' perceptions of the hosts' beliefs and viewers' own certainty that global warming is happening. Thus, future research could use other approaches (e.g., pretest-posttest experimental designs) to explore further what factors moderate and/or mediate the effects of satirical television news coverage on climate change perceptions.

Additional limitations involve the extent to which the results may generalize to broader populations and to other instances of satirical climate change coverage. With regard to the former, the student sample used was unrepresentative of the U.S. public in a number of ways, particularly in terms of age and education. The sample was also more liberal than the general public. As previously noted, the audiences for *The Daily Show* and *The Colbert Report* are also disproportionately young, educated, and liberal; thus, the biases in the sample dovetail with the patterns in who watches these programs. Even so, it would be useful to replicate the present study's results among more representative samples.<sup>13</sup>

With regard to the generalizability of the treatments, the video for each program consisted of a relatively brief clip from a single segment. As a result, the styles of humor used in the clips were confounded with the identity of the hosts, both of whom are well-known media personalities. Accordingly, future research could test for effects produced by other satirical television news segments. An ideal design for isolating the effects of humor style would be to hold the identity of the host constant (e.g., by having one unfamiliar actor discuss climate change using different humor styles). However, such a design would involve sacrificing a degree of external validity to enhance internal validity; the design used here has the advantage of testing the effects of real—and typical—satirical climate change coverage.

The design of the study, which did not include a condition involving exposure to nonsatirical coverage, also precludes claims that satirical news coverage produces unique effects on climate change perceptions. Indeed, Feldman et al.'s (2011) research found complementary effects of satirical news use and traditional news use on attention to news about science and technology, news about the environment, and information about global warming. In addition, the effects Feldman et al. (2012) found for CNN and MSNBC use on global warming acceptance parallel the effects observed here for *Daily Show* and *Colbert Report* coverage. Even if satirical television news coverage produces effects that parallel those for some traditional news outlets, the capacity for programs such as *The Daily Show* and *The Colbert Report* to reach audience members who do not consume traditional news lends the findings here potential substantive importance. Put another way,

satirical television news may provide an alternative route for influencing public perceptions of climate change by presenting information in an entertaining format that draws otherwise unengaged viewers.

Finally, it is worth reiterating that the effects observed for the treatments were relatively small. In part, this may reflect inherent limitations on the extent to which satirical news programs can influence public perceptions of science-related topics. On the other hand, the relatively modest effects observed here could also reflect the tendency of participants to hold strong preexisting views on the topic at hand. Even in the control condition, participants scored more than a full point higher than the midpoint of the scale for certainty that global warming is happening. Thus, satirical news coverage might exert stronger effects on topics where audience members hold weaker preexisting views. Future research could explore this possibility.

## Conclusion

As the television landscape evolves, the implications of satirical television news coverage for audience members' perceptions of climate change may evolve as well. In 2014, Colbert ended his tenure at *The Colbert Report*, and CBS announced that he would become the new host of its *Late Show* in 2015. Colbert has said that he will not use his ironic conservative talk show host persona on his new program; thus, the ways in, and extent to, which he addresses climate change on this program may differ from *The Colbert Report's* coverage even as he reaches a potentially larger audience. That same year, Comedy Central launched another satirical news program, *The Nightly Show With Larry Wilmore*, to replace *The Colbert Report*. This program includes distinctive features such as recurring panel discussions. In early 2015, Stewart revealed that he would step down as host of *The Daily Show* later that year; shortly thereafter, Comedy Central announced that Trevor Noah would succeed him as the program's host.

Another *Daily Show* alumnus, John Oliver, recently launched his own satirical program, *Last Week Tonight*, on HBO, a premium cable network. In a May 11, 2014, segment of this program, he addressed not only the scientific evidence on climate change but also the way in which traditional news coverage often "balances" the scientific consensus with the voices of climate change skeptics. After showing clips from a number of cable television news channel segments featuring one-on-one debates between Bill Nye "the Science Guy" (a popular science educator) and various climate change skeptics, Oliver staged a more "statistically representative debate" in which Nye and 96 climate scientists simultaneously debated three climate change skeptics. Future research could examine whether Oliver's satirical approach

and other approaches by new hosts such as Wilmore and Noah influence not only viewers' own perceptions of climate change but also their perceptions of scientists' views on the subject.

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### **Notes**

1. The study design was approved by the institutional review board of the authors' institution. Participation was voluntary, and participants were not offered any compensation.
2. The "Bigfoot" video included no mention of climate change. The posttest measured trust in "climate researchers" and "Bigfoot researchers" as sources of scientific information; neither form of trust varied significantly across conditions. Nor did beliefs about Bigfoot (as captured by questions included in the posttest as distractor items) vary significantly across conditions. Thus, it does not appear especially plausible that the Bigfoot video—rather than the treatment videos—produced the key effects observed by shaping more general beliefs about science.
3. Participants in this condition viewed a 1:14 clip beginning at 2:48 in the segment (<http://thedailyshow.cc.com/videos/7vmoge/weathering-fights>).
4. Although the number of participants in the *Colbert* condition was greater than the number of participants in the each of the other two conditions, a series of randomization checks revealed no significant differences across conditions on political ideology, interest in politics, interest in the environment/global warming, prior media use, or gender.
5. Participants in this condition viewed a 1:14 clip beginning at 1:38 in the segment (<http://thecolbertreport.cc.com/videos/mm5bdz/the-word---the-new-abnormal>).
6. We used categorical measures for respondents' perceptions of the hosts' beliefs given that (1) we expected substantial proportions of respondents (particularly in the *Colbert* condition) to be unsure about the hosts' beliefs and (2) we did not know, a priori, whether such responses could be treated safely as the midpoints of monotonic scales. The analyses of participants' certainty that global warming is happening suggest that the "unsure" respondents did occupy the middle ground between respondents who perceived the hosts as believing in global warming and respondents who perceived the hosts as not believing in global warming (see Figure 2); thus, future research might explore using continuous measures for such perceptions.

7. Response options ranged on a 5-point scale: *very conservative*, *somewhat conservative*, *moderate*, *somewhat liberal*, or *very liberal*. For the sake of simplicity, the analyses presented in the text rely on a three-category measure created by collapsing the “very conservative” and “somewhat conservative” responses into one category and the “very liberal” and “somewhat liberal” responses into another category. Results were substantively similar when a five-category measure was used instead of the three-category measure.
8. The  $\chi^2$  was .02, indicating an effect size closer to small (0.01) than medium (0.06), based on the guidelines proposed by Cohen (1988). The discussion in the text focuses on effect sizes for the pairwise comparisons given the nature of the hypotheses.
9. Given that the theoretical framework for the study supported clear hypotheses, the text reports results using least significant difference (LSD) tests. However, the results differed relatively little when using Bonferroni adjustments: for the *Daily Show* condition versus the control,  $p = .012$ , using LSD and  $p = .036$ , using Bonferroni; for the *Colbert Report* condition versus the control,  $p = .019$ , using LSD and  $p = .056$ , using Bonferroni. Results were based on two-tailed tests, a relatively conservative approach given directional hypotheses.
10. Similar results emerged in regression analyses predicting perceptions of Stewart’s and Colbert’s beliefs, where the models included ideology along with sex, interest in politics, interest in the environment/global warming, and prior consumption of the host’s program. Apart from the significant coefficient for ideology in the model for perceptions of Colbert’s position, none of the variables in the models predicted perceptions of either host’s beliefs. Full results are available from the authors on request.
11. Similarly significant relationships emerged after controlling (through regression analyses) for gender, ideology, interest in politics, interest in the environment/global warming, and prior media use. Full results are available from the authors on request.
12. In addition, conservative political ideology predicted less certainty, interest in the environment and global warming predicted greater certainty, Fox News use predicted less certainty, and CNN/MSNBC use predicted greater certainty. Full results are available from the authors on request.
13. A pair of two-way ANOVAs tested whether the effects of the treatments varied depending on participants’ prior use of *The Daily Show* or *The Colbert Report*. These tests yielded no evidence that the effects of the treatments differed between those who reported watching the programs at least occasionally and those who reported never watching them.

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