



# The conspiracy-effect: Exposure to conspiracy theories (about global warming) decreases pro-social behavior and science acceptance



Sander van der Linden \*

Department of Psychology, Woodrow Wilson School of Public Affairs and Andlinger Center for Energy and the Environment, Princeton University, United States

## ARTICLE INFO

### Article history:

Received 29 April 2015

Received in revised form 23 July 2015

Accepted 24 July 2015

Available online 15 August 2015

### Keywords:

Conspiracy theories

Pro-sociality

Global warming

Decision-making

Ideology

## ABSTRACT

Although public endorsement of conspiracy theories is growing, the potentially negative societal consequences of widespread conspiracy ideation remain unclear. While past studies have mainly examined the personality correlates of conspiracy ideation, this study examines the conspiracy-effect; the extent to which exposure to an actual conspiracy theory influences pro-social and environmental decision-making. Participants ( $N = 316$ ) were randomly assigned to one of three conditions; (a) a brief conspiracy video about global warming, (b) an inspirational pro-climate video or (c) a control group. Results indicate that those participants who were exposed to the conspiracy video were significantly less likely to think that there is widespread scientific agreement on human-caused climate change, less likely to sign a petition to help reduce global warming and less likely to donate or volunteer for a charity in the next six months. These results strongly point to the socio-cognitive potency of conspiracies and highlight that exposure to popular conspiracy theories can have negative and undesirable societal consequences.

© 2015 Elsevier Ltd. All rights reserved.

## 1. Introduction

A conspiracy theory purports that some covert and powerful individual(s), organization(s) or group(s) are intentionally plotting to accomplish some sinister goal (van der Linden, 2013). While once conceived of as the “implausible visions of a lunatic fringe” (Melley, 2000), national surveys have revealed that over 50% of the American public now believes in at least one conspiracy (Oliver & Wood, 2014). Although belief in conspiracy theories is sometimes associated with a latent psychopathology such as paranoid schizophrenia (Barron, Morgan, Towell, Altemeyer, & Swami, 2014; Darwin, Neave, & Holmes, 2011), social-personality psychologists have developed an increased interest in explaining conspiracy ideation in the non-clinical population.

It is important to note that the purpose of this line of research is not to ascertain whether or not a conspiracy theory is true<sup>1</sup>. In fact, it is not belief in a particular conspiracy that is of interest here, but rather the social-psychological nature and consequences of conspiracy theorizing. For example, a number of recent studies have revealed that belief in one conspiracy is highly predictive of belief in other conspiracies (Goertzel, 1994; Swami et al., 2011). This is characteristic of a “monological” or self-supporting belief system in which explanations about world events

are processed not according to rational deliberation of the evidence but rather in terms of their consistency with a larger conspiratorial worldview (Dagnall, Drinkwater, Parker, Denovan, & Parton, 2015; Lewandowsky, Gignac, & Vaughan, 2013; Wood, Douglas, & Sutton, 2012). Thus, belief in conspiracy theories appears to be a “slippery slope”, where belief in one theory can quickly lead to espousal of other conspiracy theories, even when such theories are fictitious or mutually inconsistent with one another (e.g., Swami et al., 2011; Wood et al., 2012).

### 1.1. Social consequences of conspiracy ideation

One important area of research that has received much less attention concerns the social consequences of widespread conspiracy ideation. Indeed, while some conspiracy theories are merely false, others are based on beliefs that are not only false but also harmful (Maibach, 2012; Sunstein & Vermeule, 2009). Thus, mass espousal of (some) conspiracy theories could have serious negative societal consequences. For example, conspiracy ideation has increasingly been associated with the motivated rejection of science, including anti-vaccination theories, denial of the link between AIDS and HIV as well as the rejection of climate science (Lewandowsky, Gignac, & Vaughan, 2013; Lewandowsky, Oberauer, & Gignac, 2013; Lewandowsky, Gignac, & Oberauer, 2013). In fact, while 97% of climate scientists have concluded that human-caused global warming is happening (Cook et al., 2013), over 37% of Americans currently believe that global warming is a “hoax” (Public Policy Polling, 2013). Public dismissal of the risk of climate change poses serious barriers to individual and societal engagement with the issue (Dunlap &

\* Department of Psychology, 421 Peretsman-Scully Hall, Princeton University, United States.

E-mail address: [sander.vanderlinden@princeton.edu](mailto:sander.vanderlinden@princeton.edu).

<sup>1</sup> Although different philosophical positions may be maintained with respect to the legitimacy of conspiracy theories, prima facie skepticism toward their accuracy is usually justified (Clarke, 2002).

McCright, 2011). Although little is currently known about the effect that conspiracy theories have on pro-social behavior and decision-making, some preliminary work has alluded to the social consequences of conspiracism. For example, recent research has shown that reading information about specific conspiracy theories can decrease people's intention to vote and vaccinate (Jolley & Douglas, 2014). Conspiracy ideation has also repeatedly been associated with high-levels of distrust, hostility, aggression and right-wing authoritarianism (Abalakina-Paap, Stephan, Craig, & Gregory, 1999; Grzesiak-Feldman, 2015). Consequently, it is plausible that conspiratorial thoughts can make people less pro-social and less willing to contribute to important societal causes.

## 1.2. Current study

The current paper extends this area of research by investigating the “conspiracy-effect”; the extent to which mere exposure to a conspiracy theory about an important societal issue (i.e., global warming) influences (a) people's perception of the level of scientific agreement on the issue, (b) pro-environmental behavior as well as (c) general pro-social tendencies.

## 2. Method

### 2.1. Participants

Study participants were American adults ( $N = 316$ ) recruited from Amazon Mechanical Turk (MTurk).<sup>2</sup> In total, 131 males and 179 females participated, ranging between 18 and 65 years of age (modal age bracket = 25–44). Respondents were invited to participate in an online survey experiment and paid a small financial reward (\$0.50) for completing the task.

### 2.2. Materials and procedure

Participants were randomly assigned to either a “conspiracy”, “pro-climate” or control condition. In the conspiracy condition, participants watched a short 2-minute video clip of a popular conspiracy movie; “The Great Global Warming Swindle” (Durkin, 2007). In the pro-climate condition, participants viewed a 2-minute United Nations (2009) video clip; “Raise Your Voice about Climate Change”. In the control group, respondents were asked to solve a neutral word puzzle. Informed consent was obtained from participants prior to the study. Although respondents were informed that audio/video features must be enabled in order to participate, six participants were excluded from the analysis because their viewing-records indicated that they did not watch the (entire) video clip—their exclusion had no bearing on the results.

### 2.3. Measures

#### 2.3.1. Perceived scientific agreement

Participants' perception of the level of scientific agreement on climate change was assessed with the following question; to the best of your knowledge, what % of climate scientists have concluded that human-caused climate change is happening? (0%–100%).

#### 2.3.2. Pro-environmental behavior

As a measure of pro-environmental behavior, participants were asked whether they wanted to participate in and personally sign a real

public online “stop global warming” petition<sup>3</sup>. Responses were coded as (1 = signed) or (0 = did not sign).

#### 2.3.3. Pro-social intent

General pro-social tendencies were assessed with the following two questions; how likely are you to donate to a charity or charitable organization in the next six months? How likely are you to volunteer your time at a local community or charitable organization in the next six months? (1 = *Very unlikely*, 7 = *Very likely*).

#### 2.3.4. Political ideology

Participants were asked the following question; “In general, I think of myself as” (1 = *Very conservative*, 4 = *Moderate*, 7 = *Very liberal*).

#### 2.3.5. Manipulation check

Participants answered the follow question; to what extent do you agree with the following statement; “global warming is a hoax” (1 = *Strongly disagree*, 7 = *Strongly agree*).

## 3. Results

### 3.1. Manipulation check

A one-way ANOVA indicated a significant main effect for belief that “global warming is a hoax” between the conditions  $F(2, 309) = 4.59$ ,  $p = 0.01$ ,  $\eta_p^2 = 0.03$ . As expected, participants in the conspiracy condition agreed significantly more with the statement that “global warming is a hoax” ( $M = 3.80$ ,  $SE = 0.20$ ) compared to those in the control condition ( $M = 3.03$ ,  $SE = 0.19$ ). Another manipulation check confirmed that people's answers regarding the content of the videos matched their treatment group allocation.

### 3.2. Perceived scientific agreement

A one-way ANOVA revealed a significant main effect for perceived scientific agreement  $F(2, 309) = 5.77$ ,  $p < 0.01$ ,  $\eta_p^2 = 0.03$ . Post-hoc comparisons using the Tukey HSD test indicated a significant difference between the conspiracy ( $M = 61.32$ ,  $SE = 2.84$ ) and pro-climate video ( $M = 72.44$ ,  $SE = 2.34$ ) condition ( $p < 0.01$ ) as well as between the conspiracy and control ( $M = 70.01$ ,  $SE = 2.01$ ) condition ( $p < 0.05$ ). In other words, participants who were exposed to the conspiracy video judged the scientific consensus on human-caused climate change significantly lower than those who were not.

### 3.3. Pro-environmental behavior

In terms of pro-environmental behavior, among those who agreed to sign the petition, between-group differences were substantial (results by condition are provided in Table 1). Less than 23% of participants agreed to sign the petition in the conspiracy-condition vs. 43% in the pro-climate and 34% in the control group, respectively;  $\chi^2(2) = 9.20$ ,  $p < 0.01$ , Cramer's  $V = 0.17$ . Between-group comparisons were further assessed with a simple logistic regression. On average, being in the conspiracy-condition (vs. the control group), decreased an individual's odds of signing the petition by 61% ( $OR = 0.39$ ,  $SE = 0.13$ ,  $Z = -2.91$ ,  $p < 0.01$ ). The petition (behavior) and scientific consensus (belief) measures were significantly correlated ( $r = 0.28$ ,  $p < 0.01$ ).

### 3.4. Pro-social intentions

A one-way ANOVA also indicated that exposure to the conspiracy video had a (marginally) significant effect on pro-social decision-making (i.e., combined measure of donating and volunteering),  $F(2,$

<sup>2</sup> Recent evaluations have shown that MTurk samples are more demographically diverse and at least as reliable as other internet or student-based samples (e.g., Buhrmester, Kwang, & Gosling, 2011; Mason & Suri, 2012).

<sup>3</sup> <http://www.stopglobalwarming.org/>. A click-thru page verified whether a respondent actually clicked on the link.

**Table 1**

Pro-environmental behavior (signed/declined) by experimental condition.

Pro-environmental behavior	Experimental conditions			
	Pro-climate (n = 97)	Conspiracy (n = 100)	Control (n = 113)	Total (n = 310)
Signed GW petition (n = 88)	43.18%	22.73%	34.09%	100%
Declined (n = 222)	26.58%	36.04%	37.39%	100%
Total	31.29%	32.26%	36.45%	100%

309) = 2.78,  $p = 0.06$ ,  $\eta_p^2 = 0.01$ . Compared to either the control or pro-climate condition, those who were exposed to the conspiracy video were less likely to have pro-social intentions ( $M = 4.0$ ,  $SE = 0.18$ ) vs. ( $M = 3.64$ ,  $SE = 0.17$ ). The pro-environmental behavior and pro-social measures were also moderately correlated ( $r = 0.29$ ,  $p < 0.001$ ).

### 3.5. Political ideology

A logistic regression revealed that political ideology was a significant predictor of pro-environmental behavior, with a strong negative effect for conservatives ( $OR = 0.33$ ,  $SE = 0.11$ ,  $Z = -3.32$ ,  $p < 0.001$ ). Ideology was not a significant predictor of pro-social intent. No significant interaction-effect was found between the treatment conditions and political ideology. However, a  $t$ -test revealed that, conservatives were significantly more likely than liberals to endorse the statement that “global warming is a hoax” ( $M = 3.87$ ,  $SE = 0.17$ ) vs. ( $M = 2.18$ ,  $SE = 0.13$ ),  $t(228) = 8.24$ ,  $p < 0.001$ .

## 4. Discussion

This study provided evidence for the “conspiracy-effect”; the finding that brief, direct contact with conspiracy theories (about global warming) can be sufficient to significantly decrease pro-environmental decision-making, including reduced confidence in the scientific consensus on climate change. This is important because prior research has shown that the public’s perception of the scientific consensus functions as an important “gateway” cognition that guides other key beliefs about the issue, such as the belief that climate change is happening, human-caused and a worrisome problem that requires public action (Ding, Maibach, Zhao, Roser-Renouf, & Leiserowitz, 2011; Lewandowsky et al., 2013b; van der Linden, Leiserowitz, Feinberg, & Maibach, 2015). Moreover, this study finds that briefly exposing the public to conspiratorial thoughts about a specific issue may even decrease general pro-social tendencies. These findings are consistent with other recent research that has alluded to the notion that conspiracy ideation can lead to the motivated rejection of science and decreased civic engagement (Jolley & Douglas, 2014; Lewandowsky et al., 2013a, 2013c).

Although conspiracy theorizing has been observed across the entire political/ideological spectrum (Oliver & Wood, 2014), it is well-documented that organized climate change denial is especially predominant among right-wing, conservative Republicans (Dunlap & McCright, 2011; Dunlap & Jacques, 2013; Lewandowsky, Gignac and Oberauer, 2013; Lewandowsky, Gignac and Vaughan, 2013; Lewandowsky, Oberauer, et al., 2013). Consistent with prior research, this study generally finds that compared to liberals, conservatives were more likely to believe that global warming is a hoax and accordingly, less likely to sign a petition to help stop global warming. Interestingly, no significant interaction was found between the treatment conditions and political ideology, which could be explained by the fact that perhaps conservatives were already likely to hold some conspiratorial views about global warming. After watching the conspiracy video, conservatives and liberals were equally (less) likely to donate or volunteer for a charity. In conclusion, this research illustrates that researchers and policy-makers should not underestimate the socio-cognitive potency of conspiracies, as growing public belief in and potential exposure to conspiracy theories can have negative and undesirable societal consequences.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.paid.2015.07.045>.

## References

- Abalakina-Paap, M., Stephan, W. G., Craig, T., & Gregory, W. L. (1999). Beliefs in conspiracies. *Political Psychology*, 20(3), 637–647.
- Barron, D., Morgan, K., Towell, T., Altemeyer, B., & Swami, V. (2014). Associations between schizotypy and belief in conspiracist ideation. *Personality and Individual Differences*, 70(156), 159.
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon’s Mechanical Turk: A new source of inexpensive, yet high-quality data? *Psychological Science*, 6(1), 3–5.
- Clarke, S. (2002). Conspiracy theories and conspiracy theorizing. *Philosophy of the Social Sciences*, 32(2), 131–150.
- Cook, J., Nuccitelli, D., Green, S. A., Richardson, M., Winkler, B., Painting, R., et al. (2013). Quantifying the consensus on anthropogenic global warming in the scientific literature. *Environmental Research Letters*, 8(2), 024024.
- Dagnall, N., Drinkwater, K., Parker, A., Denovan, A., & Parton, M. (2015). Conspiracy theory and cognitive style: A worldview. *Frontiers in Psychology*, 6(206)<http://dx.doi.org/10.3389/fpsyg.2015.00206>.
- Darwin, H., Neave, N., & Holmes, J. (2011). Belief in conspiracy theories. The role of paranormal belief, paranoid ideation and schizotypy. *Personality and Individual Differences*, 50(8), 1289–1293.
- Ding, D., Maibach, E. W., Zhao, X., Roser-Renouf, C., & Leiserowitz, A. (2011). Support for climate policy and societal action are linked to perceptions about scientific agreement. *Nature Climate Change*, 1, 462–465.
- Dunlap, R. E., & Jacques, P. J. (2013). Climate change denial books and conservative think tanks: Exploring the connection. *American Behavioral Scientist*, 57(6), 699–731.
- Dunlap, R. E., & McCright, A. M. (2011). Organized climate change denial. In J. S. Dryzek, R. B. Norgaard, & D. Schlosberg (Eds.), *The Oxford Handbook of Climate Change and Society* (pp. 144–160). Oxford, UK: Oxford University Press.
- Durkin, M. (2007). *The great global warming swindle*. (Director) UK: Motion Picture.
- Goertzel, T. (1994). Belief in conspiracy theories. *Political Psychology*, 15(4), 731–742.
- Grzesiak-Feldman, M. (2015). Are the high authoritarians more prone to adopt conspiracy theories? In M. Bilewicz, A. Cichocka, & W. Soral (Eds.), *The psychology of conspiracy* (pp. 99–117). New York, NY: Routledge.
- Jolley, D., & Douglas, K. M. (2014). The effects of anti-vaccine conspiracy theories on vaccination intentions. *PLoS ONE*, 9(2), e89177.
- Lewandowsky, S., Gignac, G. E., & Oberauer, K. (2013a). The role of conspiracist ideation and worldviews in predicting rejection of science. *PLoS One*, 8(10), e75637.
- Lewandowsky, S., Gignac, G. E., & Vaughan, S. (2013b). The pivotal role of perceived scientific consensus in acceptance of science. *Nature Climate Change*, 3(4), 399–404.
- Lewandowsky, S., Oberauer, K., & Gignac, G. (2013c). NASA faked the moon landing: Therefore, (climate) science is a hoax: An anatomy of the motivated rejection of science. *Psychological Science*, 24(5), 622–633.
- Maibach, E. (2012). Knowing our options for setting the record straight, when doing so is particularly important. *Psychological Science in the Public Interest*, 13(3), 105.
- Mason, W., & Suri, S. (2012). Conducting behavioral research on Amazon’s Mechanical Turk. *Behavior Research Methods*, 44(1), 1–23.
- Melley, T. (2000). *Empire of conspiracy: The culture of paranoia in postwar America*. Ithaca, NY: Cornell University Press.
- Oliver, J. E., & Wood, T. J. (2014). Conspiracy theories and the paranoid style(s) of mass opinion. *American Journal of Political Science*, 58(4), 952–966.
- Polling, Public Policy (2013). Conspiracy theory poll results. Available at: <http://www.publicpolicy.com/main/2013/04/conspiracy-theory-poll-results.html>
- Sunstein, C. R., & Vermeule, A. (2009). Conspiracy theories: Causes and cures. *Journal of Political Philosophy*, 17(2), 202–227.
- Swami, V., Coles, R., Stieger, S., Pietschnig, J., Furnham, A., Rehim, S., et al. (2011). Conspiracist ideation in Britain and Austria: Evidence of a monological belief system and associations between individual psychological differences and real-world and fictitious conspiracy theories. *British Journal of Psychology*, 102(3), 443–463.
- United Nations (2009). *Raise your voice about climate change [Youtube broadcast]*.
- van der Linden, S. (2013). What a hoax: Why people believe in conspiracy theories. *Scientific American Mind*, 24(4), 41–43.
- van der Linden, S., Leiserowitz, A., Feinberg, G., & Maibach, E. (2015). The scientific consensus on climate change as a gateway belief: Experimental evidence. *PLoS ONE*, 10(2), e0118489.
- Wood, M. J., Douglas, K. M., & Sutton, R. M. (2012). Dead and alive: Beliefs in contradictory conspiracy theories. *Social Psychological and Personality Science*, 3(6), 767–773.