AMERICAN PSYCHOLOGICAL ASSOCIATION

Journal of Experimental Psychology: Applied

ISSN: 1076-898X

https://doi.org/10.1037/xap0000455

Political and Nonpolitical Belief Change Elicits Behavioral Change

Madalina Vlasceanu[1], Casey E. McMahon[2], Jay J. Van Bavel[1], and Alin Coman[2, 3]

[1] Department of Psychology, New York University

[2] Department of Psychology, Princeton University

[3] Princeton School of Public and International Affairs, Princeton University

Beliefs have long been theorized to predict behaviors and thus have been the target of many interventions aimed at changing false beliefs in the population. But does changing beliefs translate into predictable changes in behaviors? Here, we investigated the impact of belief change on behavioral change across two experiments ($N = 576$). Participants rated the accuracy of a set of health-related statements and chose corresponding campaigns to which they could donate funds in an incentivized-choice task. They were then provided with relevant evidence in favor of the correct statements and against the incorrect statements. Finally, they rated the accuracy of the initial set of statements again and were given a chance to change their donation choices. We found that evidence changed beliefs and this, in turn, led to behavioral change. In a preregistered follow-up experiment, we replicated these findings with politically charged topics and found a partisan asymmetry in the effect, such that belief change triggered behavioral change only for Democrats on Democratic topics, but not for Democrats on Republican topics or for Republicans on either topic. We discuss the implications of this work in the context of interventions aimed at stimulating climate action or preventative health behaviors.

Public Significance Statement

Behavioral change strategies are a critical component in addressing societal challenges, from epidemics to the climate crisis. Here, we find that changing beliefs triggers corresponding changes in behaviors, in both political and nonpolitical contexts, suggesting that targeting beliefs might be a viable strategy of behavioral change.

Keywords: belief change, behavioral change, health beliefs, political beliefs

The false belief that vaccines cause autism became widespread over two decades ago, decreasing parents' willingness to vaccinate their children, which led to an increase in preventable hospitalizations and deaths (Larson et al., 2011; Poland & Spier, 2010; Ratzan, 2010). But was the false belief that vaccines cause autism responsible for the change in vaccination behavior? And could changing that false belief through belief targeting interventions increase vaccination behavior?

Understanding the factors that influence behavior is of critical concern to individuals ranging from public health officials interested in stimulating engagement in preventative health behaviors such as vaccinations, to policymakers interested in promoting pro-environmental behaviors. Accordingly, entire research fields have focused on documenting the predictors of behavior, to unveil ways in which individuals can be nudged toward behaviors beneficial to themselves and to society (Thaler & Sunstein, 2009).

Several models of behavior theorized that beliefs are a central psychological factor impacting behavior (Ajzen, 1991; Hochbaum, 1958). A belief can be defined as the mental acceptance of the truth of a statement (Schwitzgebel, 2010), although multiple accounts of beliefs have been formulated over time, with debates on how this construct should be defined still ongoing. Beliefs are different from knowledge (Southerland et al., 2001) in the conviction with which they are held (Fishbein & Ajzen, 1975; Jervis, 2006), and the identity element they embed (Connors & Halligan, 2015; Van Bavel & Pereira, 2018). Beliefs are also different from attitudes, typically defined as one's favorability toward a target (Fishman et al., 2021), in that they lack the evaluative (e.g., from good to bad) dimension (Albarracín et al., 2014), being focused instead on the accuracy dimension (i.e., from true to false; Eagly & Chaiken, 1993, 2007).

Madalina Vlasceanu https://orcid.org/0000-0003-2138-1968

Madalina Vlasceanu played lead role in conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, validation, visualization and writing of original draft. Casey E. McMahon played supporting role in data curation, project administration and writing of review and editing. Jay J. Van Bavel played supporting role in conceptualization, supervision and writing of review and editing. Alin Coman played supporting role in conceptualization, methodology, resources and writing of review and editing.

The materials and data can be found on our open science framework page: https://osf.io/6rqkn/

The data analysis (in python and R) can be viewed as a jupyter notebook on GitHub: https://github.com/mvlasceanu/BeliefBehavior

The preregistration can be found here: Experiment 2: https://aspredicted.org/blind.php?x=vp6sa6

Correspondence concerning this article should be addressed to Madalina Vlasceanu, Department of Psychology, New York University, 6 Washington Place, 505, New York, NY 10003, United States. Email: vlasceanu@nyu.edu

The theory of planned behavior (Ajzen, 1985, 1991; an extension of the theory of reasoned action, Fishbein & Ajzen, 1975) emphasizes intentions arising from beliefs, attitudes, and social norms as the main drivers of human behavior. Similarly, the health belief model emphasizes beliefs and attitudes as predictors of human decision-making (Hochbaum, 1958; Rosenstock, 1960, 1974). Several studies provided empirical support for these theories, solidifying the relation between beliefs and behaviors (Sulat et al., 2018). For instance, individuals who believed they were susceptible to tuberculosis and believed in the benefits of early detection were more likely to have a voluntary chest X-ray (82%) than individuals who did not hold these beliefs (21%; Hochbaum, 1958).

Beyond using beliefs to *predict* behavior, a more relevant question from an applied perspective is whether beliefs can be used to *change* behaviors. On the one hand, in favor of belief change being a viable avenue for behavioral change, prior work suggests beliefs have a dynamic nature, being subject to change (Bendixen, 2002). For example, beliefs can be changed by leveraging fictional narratives (Wheeler et al., 1999), nudging accuracy goals (Pennycook et al., 2020), manipulating memory accessibility (Vlasceanu & Coman, 2018; Vlasceanu, Morais, et al., 2020), appending emotional arousing images (Vlasceanu, Goebel, et al., 2020), triggering prediction errors (Vlasceanu et al., 2021a), or increasing the salience of social norms (Vlasceanu & Coman, 2022a). Furthermore, prior work has found that correcting fake news can be successful even on ideological topics (Porter et al., 2018; Wood & Porter, 2019). Similarly, in a recent randomized field experiment, conservative Fox News viewers' political beliefs were changed after being monetarily incentivized to watch Cable News Network (CNN) for a month (Broockman & Kalla, 2022). And, voters' support for both Republican and Democratic figures (i.e., Donald Trump and Bernie Sanders) was reduced when it was revealed that they shared considerably (i.e., 4 times) more false than true information (Swire-Thompson et al., 2020). Moreover, beliefs have been found to predict behaviors—for example, religious beliefs were found to predict crime rates (Shariff & Rhemtulla, 2012), and beliefs about intelligence were found to predict learning success (Mangels et al., 2006). Consequently, considering both beliefs' dynamic nature and their strong association to behaviors, changing beliefs might be a viable avenue for eliciting behavioral change.

On the other hand, the converse hypothesis–that changing beliefs may not be an effective strategy of changing behaviors–is supported by prior work on social identity theory (Tajfel & Turner, 2004). Specifically, the belief change literature suggests that some beliefs can be notoriously hard to change (Ecker, Lewandowsky, & Apai, 2011; Ecker, Lewandowsky, Swire, & Chang, 2011). For example, prior work suggests that partisan identities can impair belief updating (Van Bavel & Pereira, 2018). Similarly, extensive research suggests that fact-checking may have a limited range of utility for political topics (for a review, see Van Bavel et al., 2021). But even if such beliefs are successfully changed, this change may not translate into a change in behavior. Indeed, when social identities and social norms are salient, beliefs have been found to be an unreliable predictor of behavior (Paluck, 2009). For instance, even when beliefs in statements made by Donald Trump were successfully changed as a function of new evidence, these changes in beliefs did not translate into changes in favorability ratings (Nyhan et al., 2020) or intentions to vote for Trump in the following United States presidential election (Swire et al., 2017). Similar effects were found on the other side of the political divide, with supporters of Bernie Sanders (Swire-Thompson et al., 2020). Taken together, this work suggests that changing beliefs might not trigger behavioral change in an ideological context.

Across two experiments, we study the impact of changing non-ideologically (Experiment 1) and ideologically (Experiment 2) charged beliefs on behavioral change. To test this effect, we designed an experiment composed of five phases. First, participants rated the accuracy of a set of statements (belief pretest phase). In Experiment 1, these statements were health-related (e.g., "A child's untreated wandering eye can lead to permanent vision loss."), and in Experiment 2 (i.e., preregistered replications of Experiment 1), they were politically charged (e.g., "Millions of children in the US have witnessed a shooting in the past year."). In both experiments, half of the statements were accurate, and half were inaccurate. Participants were then directed to an incentivized-choice task (behavior pretest) in which they were told they would be able to donate funds allocated by our team (a fixed amount) to campaigns relevant to the issues discussed in the statements previously rated. Then, in the evidence phase, participants were shown the actual accuracy of the initial statements, as supported by scientific investigations into each matter. Finally, they were asked to evaluate each statement again (belief posttest) and were given the opportunity to adjust their fund allocation choices (behavior posttest).

Our first hypothesis is that beliefs at pretest will predict behavior at pretest. Our second hypothesis is that belief change from pretest to posttest will trigger behavioral change from pretest to posttest. More specifically, we hypothesized that an intervention aimed at increasing a statement's believability will lead to increased monetary support, and an intervention aimed at decreasing a statement's believability will lead to decreased monetary support allocated to the corresponding campaign.

Experiment 1

Method

Participants

We aimed for a sample size of 200 participants to achieve a 0.8 power for an effect size of Cohen's $d = 0.2$ in a two-tailed paired sample t test at an α level of 0.05. A total of 200 participants were recruited for the experiment on Cloud Research, a participant-sourcing platform for online research providing immediate access to millions of diverse, high-quality respondents around the world (Litman et al., 2017). Participants were compensated at the platform's standard rate. Of the 200 total participants, 183 passed the preestablished attention checks (e.g., "Please select 2 for if you're still reading these questions.") and were included in the rest of the analyses ($M_{age} = 53$; $SD_{age} = 17$; 63% female). The experiment was approved by the institutional review board at Princeton University.

Stimulus Materials

We used a set of 16 statements (e.g., "A child's untreated wandering eye can lead to permanent vision loss in that eye"; Appendix A), pretested by Vlasceanu, Morais, et al. (2020) on a Cloud Research sample ($N = 217$; $M_{age} = 54.16$, $SD_{age} = 16.3$; 82% women). Believability ratings were collected (i.e., "How accurate or inaccurate do you think this statement is" on a scale from 0 = *extremely inaccurate* to 100 = *extremely accurate*) to ensure that all

the statements are moderately believable (M = 51.02, SD = 24.6) which can avoid any floor or ceiling effects in belief change. Half of the statements were actually accurate, while the other half were inaccurate pieces of information, as determined by published scientific articles or other official sources.

For each of the 16 statements, we designed a corresponding donation campaign (e.g., "Campaign for raising awareness about the danger of children's untreated wandering eyes"), tailored to raise awareness about that specific topic.

Last, for each of the 16 statements, we also constructed a piece of evidence, arguing in favor of the accurate statements (e.g., "Studies/reports show that a child's untreated wandering eye can lead to permanent vision loss in that eye") and against the inaccurate statements (e.g., "Studies/reports show that allergy shots are not helpful for food allergies").

Design and Procedure

Participants were told they would participate in an experiment about people's evaluation of information and were directed to the survey on the Qualtrics platform. After completing the informed consent form, participants were directed to the first phase (pretest), in which they rated a set of 16 statements (one on each page) by indicating the degree to which they believed each statement (i.e., "How accurate do you think this statement is," from 1 = *extremely inaccurate* to 100 = *extremely accurate*). In the second phase (behavior pretest), participants were told they would be able to help address some of the issues brought up by these statements, by donating funds allocated by our team to campaigns corresponding to each statement (e.g., "Campaign for raising awareness about the danger of children's untreated wandering eyes"), designed to raise awareness (i.e., "For each person completing this survey, our team will donate $100 to a campaign, [or will allocate the donation to multiple campaigns] according to each person's preference. In this phase, you will choose how to allocate the $100 donation").

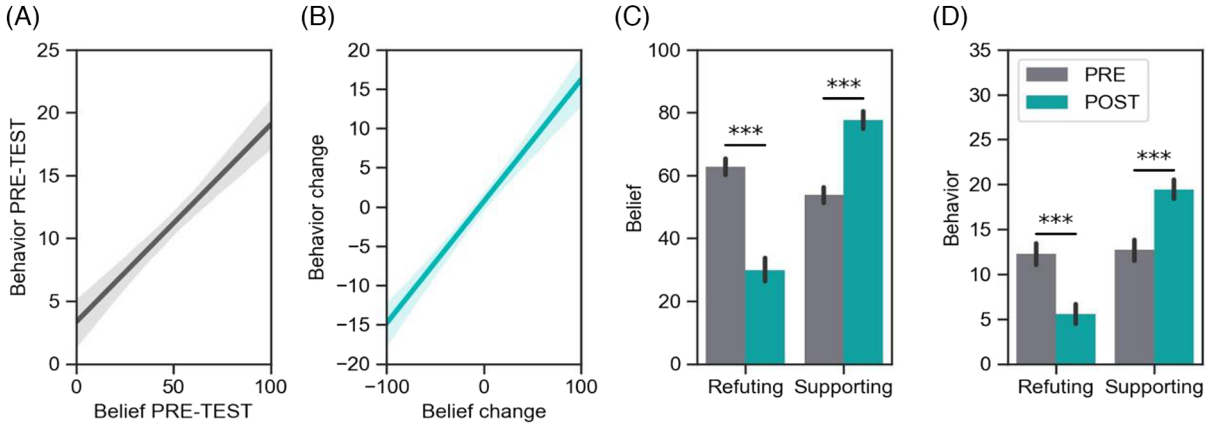
In the evidence phase, participants were provided evidence in favor of the accurate information against the inaccurate information from the first phase, as denoted by scientific investigations into each matter. The evidence instructions were as follows: "You will now see which statements are accurate and which are not, based on scientific studies and official reports." These instructions were followed by the pieces of evidence, which were of the sort "Studies/reports show that a child's untreated wandering eye can lead to permanent vision loss in that eye." No explanations or additional factual information was provided. Then, participants were asked to evaluate each statement again (belief posttest) and were given the opportunity to adjust their fund allocation choices (behavior posttest). Finally, participants answered the demographic information questions and were debriefed. In the debrief, we informed participants the campaigns were not real, and their donations would not be carried through.

Results

To test our first hypothesis, that beliefs at pretest will predict behavior at pretest, we conducted a linear mixed model with behavior at pretest as the dependent variable and belief at pretest as the fixed effect, including by-participant and by-item random intercepts. We found a significant effect of belief at pretest, $\beta = 0.17$, SE = 0.01, $t(1{,}449)$ = 9.26, $p < .001$, on behavior at pretest (Figure 1A). This result suggests that people's beliefs predict their corresponding behaviors.

For our second hypothesis, that belief change will trigger behavioral change, we ran a linear mixed model with behavior change as the dependent variable, belief change, and behavior at pretest as fixed effects, including by-participant and by-item random intercepts. In the second model, we included behavior at pretest as a fixed effect to observe the independent effect of belief change on behavior change while controlling for initial behavioral tendencies that could potentially confound the relationship of interest. We found a significant effect of belief change, β = 0.08, SE = 0.01,

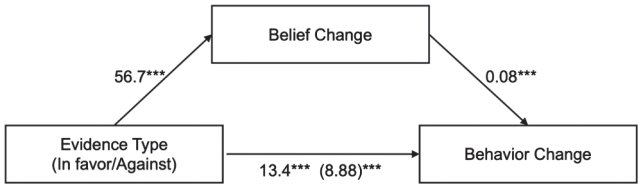
Figure 1
Experiment 1 Results



Note. Behavior at pretest as a function of belief at pretest (Panel A). Behavior change as a function of belief change (Panel B). Belief (Panel C) and behavior (Panel D) data split by the evidence manipulation (refuting vs. supporting belief evidence) and by time point (pretest in gray vs. posttest in green). The results suggest that beliefs predict behaviors, and belief change triggers behavioral change. See the online article for the color version of this figure.
*** $p < .001$.

Figure 2

Regression Coefficients for the Relationship Between Evidence Type (in Favor vs. Against) and Behavior Change as Mediated by Belief Change



Note. The standardized regression coefficient between evidence type and behavior change, controlling for belief change, is in parentheses. This result suggests that the effect of evidence on behavioral change is partially mediated by belief change.
*** $p < .001$.

$t(1,308) = 6.8$, $p < .001$, on behavioral change (Figure 1B). This result suggests that belief change triggers behavioral change in a nonideological context.

To assess whether the effect of evidence type (in favor/against) on behavioral change would be mediated by the degree of belief change, we ran a mediation model following guidelines and using the R mediation package published by Tingly et al. (2014). As Figure 2 illustrates, the regression coefficient between evidence type (in favor/against) and behavior change was statistically significant, as were the regression coefficients between evidence type and belief change and between belief change and behavior change when controlling for evidence type.

We tested the significance of the indirect effect using bootstrapping procedures. The indirect effect was computed for each of 10,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. The bootstrapped indirect effect was 4.58, and the 95% confidence interval ranged from 2.48 to 6.71. Thus, the indirect effect was statistically significant, $p < .001$ (Tables 1 and 2). This result suggests that the effect of evidence on behavioral change is partially mediated by belief change.

Discussion

In Experiment 1, we found support for our two hypotheses: (1) that belief predicts behavior and (2) that belief change predicts behavioral change in a nonideological context. Moreover, when investigating the mechanism of the latter process, we found that evidence triggered belief change, which, in turn, triggered behavioral change. This experiment suffers, however, from two important limitations. First, contrary to real-world scenarios, participants' donation behavior came at no personal cost. And second, the health beliefs tested here were fairly neutral, thus moderately endorsed. In real-world circumstances, people's beliefs are typically ideologically charged. To overcome these limitations, in Experiment 2, we allowed participants to keep the funds to themselves if they did not want to engage in the donation behavior, increasing the ecological validity of the paradigm. Moreover, the beliefs tested in Experiment 2 were partisan (i.e., Democratic or Republican).

Experiment 2

Method

Participants

Given our interest in exploring partisan differences in the effects reported in the previous study, we preregistered our intent to collect a sample of 400 participants to detect an effect size of 0.09 in a within-between interaction of a repeated-measures analysis of variance with 80% power at a significance level of 0.05 (two-tailed). We recruited a total of 421 Americans from Amazon Mechanical Turk (MTurk; an online recruiting source that is not nationally representative but produces similar results to nationally representative samples in various experiments related to politics; Coppock, 2019). Of them, 393 (256 Democrats and 137 Republicans) passed the preestablished attention checks ($M_{age} = 37.8$; $SD_{age} = 11.15$; 59% female). The experiment was approved by the institutional review board at Princeton University.

Stimulus Materials

We used a set of eight politically charged statements (Appendix B), half accurate, and half inaccurate as determined by published scientific articles or other official sources. These statements had been pretested in prior work by Vlasceanu et al. (2021a) to ensure that half of them were endorsed more by Democrats than by Republicans (e.g., "Millions of children in the US have witnessed a shooting in the past year") and vice-versa (e.g., "Hundreds of thousands of abortions in the US are paid for with public funds each year").

For each statement, we constructed a corresponding piece of evidence, in favor of the accurate statements and against the inaccurate ones. An example of a piece of evidence is as follows: "Millions of children in the US have witnessed a shooting in the past year. Studies/reports show that 4% of children in the US (or 2.96 million children) have witnessed a shooting in the past year." Moreover, for each statement, we constructed a corresponding campaign (e.g., "Gun Control

Table 1

Regression Analyses Associated With the Mediation Model

Predictors	*b* (*SE*)	*t*	*F*	*df*	R^2	*p*
Model 1						
Evidence type	13.4 (0.95)	14.1***	200.7	(1, 364)	0.355	<.001
Model 2						
Evidence type	8.88 (1.38)	6.40	115.2	(2, 363)	0.38	<.001
Belief change	0.08 (0.01)	4.42***			0.38	<.001

Note. *b* = regression coefficients; *SE* = standard error.
*** $p < .001$.

Table 2
Causal Mediation Analyses: Nonparametric Bootstrap CI, With 10,000 Simulations

		95% CI		
Estimate	Estimate	LL	UL	*p*
Indirect effect (ACME)	4.58	2.48	6.71	<.001***
Direct effect (ADE)	8.86	6.14	11.64	<.001***
Total effect	13.44	11.56	15.26	<.001***
Proportion mediated	0.34	0.17	0.50	<.001***

Note. ACME = average causal mediation effects; ADE = average direct effect; LL = lower limit; UL = upper limit.
*** $p < .001$.

Campaign for raising awareness that millions of children in the US have witnessed a shooting in the past year").

Design and Procedure

The design and procedure were the same as in Experiment 1 (i.e., five phases: belief pretest, behavior pretest, evidence, belief posttest, behavior posttest), with one exception—participants were now given the option of keeping the monetary donation allocated by our team for themselves, instead of donating it to one or more campaigns

> For each person completing this survey, we will donate $10. You will decide where this donation will end up. You can allocate this donation to one or more of the following campaigns. You can also decide to keep part or all of it for yourself (in which case we will ask for your Venmo information to complete the transfer). In this phase, you will choose how to allocate the $10.

After completing the experiment, we sent participants the funds corresponding to their choice if they decided to keep part of or the entire amount. This addition to the design was made to increase the ecological validity of the donation behavior, which, in real life comes at a monetary cost to the individual.

Results

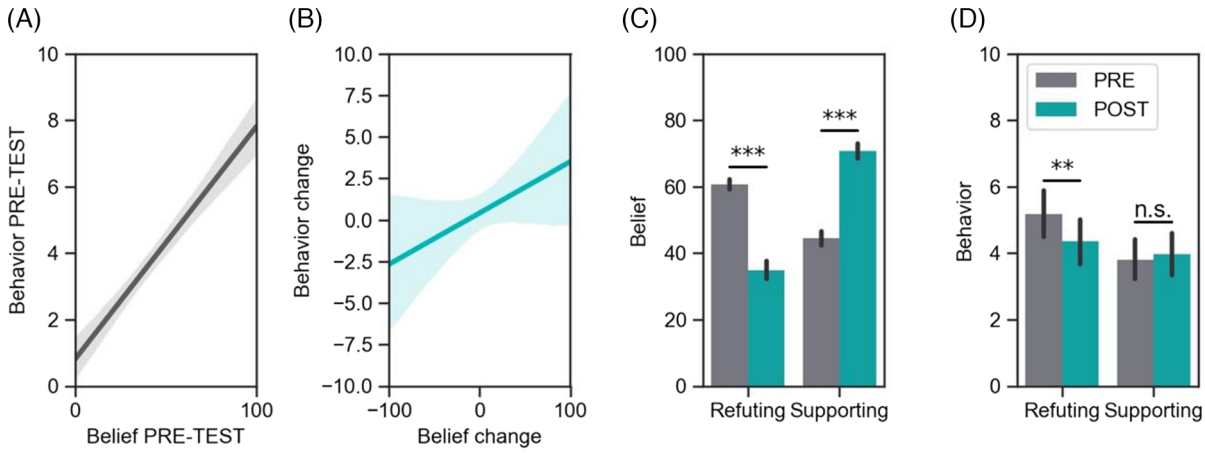
To replicate the results of Experiment 1, we conducted a linear mixed model with behavior at pretest as the dependent variable and belief at pretest as the fixed effect, including by-participant and by-item random intercepts. Just like in Experiment 1, we found a significant effect of belief at pretest, $\beta = 0.05$ $SE = 0.007$, $t(2,440) = 7.95$, $p < .001$, on behavior at pretest (Figure 3A).

Moreover, we ran a linear mixed model with behavior change as the dependent variable, belief change, and behavior at pretest as fixed effects, including by-participant and by-item random intercepts, and found a significant effect of belief change, $\beta = 0.01$, $SE = 0.004$, $t(396) = 3.36$, $p < .001$, on behavioral change (Figure 3B), successfully replicating the impact of belief change on behavioral change in an ideological context.

In exploratory analyses, we investigated the relationship between belief and behavior as it interacts with item and participant partisan identity. First, for belief at pretest and behavior at pretest, we conducted a linear mixed model with behavior at pretest as the dependent variable, belief at pretest as it interacts with item type (Democratic, Republican) and participant type (Democratic, Republican) as the fixed effect, including by-participant random intercepts. We found a significant main effect of belief at pretest on behavior at pretest, $\beta = 0.04$, $SE = 0.01$, $t(3,103) = 3.84$, $p < .001$, but no participant or item type interactions with this effect (Figure 4A, 4B). The results show that belief at pretest linearly predicts behavior at pretest in all of the four ideological conditions crossing participant identity and item identity (i.e., Democrats on Democratic and Republican items, as well as Republicans on Democratic and Republican items).

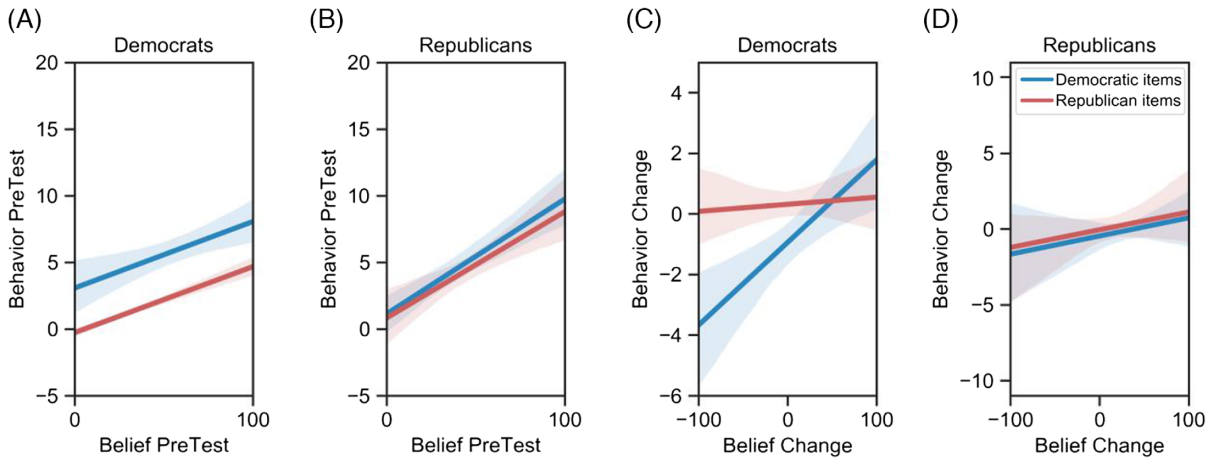
Second, for belief change and behavior change, we conducted a linear mixed model with behavior change as the dependent variable, belief change as it interacts with item identity type (Democratic,

Figure 3
Experiment 2 Results



Note. Behavior at pretest as a function of belief at pretest (Panel A). Behavior change as a function of belief change (Panel B). Belief (Panel C) and behavior (Panel D) data split by the evidence manipulation (refuting vs. supporting belief evidence) and by time point (pretest in gray vs. posttest in green). See the online article for the color version of this figure.
** $p < .01$. *** $p < .001$. n.s. = not significant ($p > .05$).

Figure 4
Experiment 2 Ideological Results



Note. ($N = 393$). Democratic participants' (Panel A) and Republican participants' (Panel B) behavior at pretest as a function of belief at pretest of Democratic statements (in blue) and Republican statements (in red). Democratic participants' (Panel C) and Republican participants' (Panel D) behavior change as a function of belief change of Democratic statements (in blue) and Republican statements (in red). See the online article for the color version of this figure.

Republican) and participant identity type (Democratic, Republican) as the fixed effect, including by-participant random intercepts. We found a significant main effect of belief change, $\beta = 0.02$, $SE = 0.005$, $t(3,136) = 4.73$, $p < .001$, on behavioral change, and an interaction between the effect in Democratic participants on Democratic items with the effect in Democratic participants on Republican items, $\beta = 0.02$, $SE = 0.009$, $t(3,136) = 2.74$, $p = .006$, such that Democratic participants changed their behaviors as a function of belief change more for Democratic compared to Republican items (Figure 4C). The results also show that belief change linearly predicts behavior change only for the Democratic participants on Democratic items and not for the other three ideological conditions crossing participant identity and item ideology (i.e., Democrats on Republican items, Republicans on Democratic and Republican items; Figure 4C, 4D).

Discussion

In Experiment 2, we replicated the main findings that belief predicts behavior, and that belief change elicits behavioral change in an ideological context. When investigating these effects' interactions with partisan identity, we found that beliefs' predictive power of behaviors universally holds across identity boundaries. However, belief change triggered behavioral change only for Democratic participants on Democratic topics. We also found that Democrats changed their behaviors as a function of belief change more for Democratic compared to Republican topics, but Republicans did not exhibit such a difference between Democratic and Republican topics, pointing to an asymmetric partisan bias in the effect of belief change on behavioral change.

General Discussion

In two experiments including a preregistered replication, we found that both health-related and politically charged beliefs predict people's donation behaviors in an incentivized-choice task. More importantly from an applied, policy intervention perspective, we also found that changing these beliefs through evidence exposure triggers behavioral change. These findings are consistent with and further advance the literature on behavioral nudges (Thaler & Sunstein, 2009), as well as prior theoretical accounts of behavior (Ajzen, 1991; Hochbaum, 1958) by extending the investigation beyond the health domain, which was classically prioritized in past accounts of behavioral influences by way of beliefs (e.g., theory of planned behavior, Ajzen, 1991; the health belief model, Hochbaum, 1958). Moreover, these effects are generalizable as they replicate across online platforms (i.e., Could Research, MTurk), and they are ecologically valid as they avoid experimenter demands (i.e., the donation behavior occurred at a personal cost to participants).

When testing interactions with identity, we found that beliefs' predictive power of behaviors universally holds across identity boundaries, consistent with prior work on belief change mechanisms (Vlasceanu et al., 2021a). However, belief change triggered behavioral change only for Democratic participants on Democratic topics, but not for Democratic participants on Republican topics or for Republican participants on either topic. This finding, which should be replicated by future research to ensure reliability, points to an asymmetric partisan bias in the effect of belief change on behavioral change, and it is consistent with prior work showing that partisan identities can impair belief updating (Van Bavel & Pereira, 2018). This finding is also consistent with work showing that even when beliefs in statements made by Donald Trump were successfully changed as a function of new evidence, these changes did not translate into changes in favorability ratings (Nyhan et al., 2020) or intentions to vote for Trump (Swire et al., 2017). This asymmetry may reflect the sociopolitical context at the time of data collection for Experiment 2 (i.e., January 2021, days before the inauguration of a Democratic president), such that Republican participants' willingness to update their beliefs rationally may have failed to translate into corresponding changes in behavior under such conditions. This

speculation is consistent with existing work on the impact of threat and uncertainty on political beliefs (Haas & Cunningham, 2014). While difficult to programmatically explore in a dynamic real-world situation (e.g., COVID-19 pandemic, nationwide antiracism protests, pro-Trump rallies), further research clarifying how consequential events affect belief and behavioral change is worth pursuing.

In the present work, we use a controlled, experimental approach to studying the link between beliefs and behaviors. Constraining the investigation to these minimal conditions allows us to isolate the effect of belief change on behavioral change. It is important to note, however, that in real-world situations, additional factors such as conversational interactions following exposure to evidence would likely affect the degree to which the people integrate evidence into their beliefs and adjust their behaviors. Therefore, while exploring the relation between beliefs and behavior at the individual level is essential from a theoretical perspective, understanding how communities of individuals synchronize their behaviors is urgent from an applied point of view, as these dynamics might reveal how to better promote desirable behaviors in the population, of particular interest to policymakers interested in impacting communities (Dovidio & Esses, 2007). Indeed, the dynamic information flow between community members has been shown to exert a strong influence on people, impacting their individual memories (Cuc et al., 2007), their beliefs (Vlasceanu et al., 2021b), and their behaviors (Frankel & Swanson, 2002). It has also been found to affect collective-level phenomena, leading to the formation of collective memory (Coman et al., 2016) and collective beliefs (Vlasceanu, Goebel, et al., 2020; Vlasceanu et al., 2021b). However, little is known about the impact of network structure on the formation of collective behavior, a construct of vital social importance. A growing body of work has been focusing on the cognitive and social processes involved in these collective phenomena (Borge et al., 2018; Vlasceanu et al., 2018), revealing how individual-level effects are amplified at the network level (Vlasceanu, Goebel, et al., 2020), as well as the importance of network structure in their emergence (Vlasceanu et al., 2021b). Therefore, future work should consider investigating the effects of beliefs on behaviors at a collective level, focusing on the impact of conversational interactions on the effect, as well as on the role of network structure in the formation of collective behaviors.

Other future directions prompted by the current research include the investigation of the effect of beliefs on behaviors as it interacts with other variables. Of particular importance is the interaction between the hereby unveiled effect and social norms (Cialdini & Goldstein, 2004). One hypothesis in this context is that beliefs might impact behaviors more when the behaviors are perceived as normative rather than nonnormative. This hypothesis follows from seminal work showing that changing beliefs regarding outgroup members does not impact nonnormative behaviors toward them (Paluck, 2009). Moreover, recent work shows that beliefs change more in line with normative compared to nonnormative evidence (Vlasceanu & Coman, 2022a), providing further insights into the mechanism of interest.

Another variable worth investigating as it interacts with the effect of beliefs on behavior is cultural tightness/looseness (Harrington & Gelfand, 2014). Such an exploration has the potential to reveal the effect's strength and boundary conditions across different groups and cultures, enhancing the generalizability to the wider human population. It would also add to the efforts to overcome one of the main shortcomings of psychological research to date, that most effects are based on a "small corner of the human population," an impediment to identifying universal principles of human psychology (Arnett, 2016; Henrich et al., 2010).

A third variable that might interact with the hereby explored effect is the source identity (Chung et al., 2008; Slater & Rouner, 1996; Vlasceanu & Coman, 2022b). Prior work found that people are most influenced by others whom they share a common identity (Abrams et al., 1990; Centola, 2011). Therefore, identifying with the source sharing the evidence might increase the likelihood of incorporating that evidence in changing beliefs and behaviors. However, recent work has shown that belief change by way of evidence incorporation from various sources along the ideological spectrum does not interact with individuals' own political identity, although behavioral intentions as a function of belief change were displayed a partisan bias (Vlasceanu & Coman, 2022b). Thus, empirically establishing whether the source identity interacts with the effect of beliefs on behavior is a future direction of high interest.

Finally, in future work, we are aiming at addressing the various limitations in the current studies. For example, the use of mediation analysis for unveiling mechanistic processes has been suggested to be problematic (Bullock et al., 2010). In the future, we are interested in uncovering such mechanistic relationships using experimental paradigms that reveal causal connections between variables. Also, the exploratory analyses of the main effect of belief change on behavioral change interacting with identity should be interpreted with caution until further replicated. And for additional generalizability of these results, this work should be extended into domains beyond healthcare and politics. For example, future work could test whether changing climate beliefs can be an effective strategy of stimulating climate action.

Beyond their theoretical importance, these findings are of particular relevance for targeted interventions aimed at promoting constructive behaviors in the population, such as engaging in climate action or employing preventative health measures. To enact real change in these crucial societal problems, policymakers must act in ways that are guided by recommendations supported by empirical research (Oxman et al., 2010; Reimers & McGinn, 1997; Snilstveit et al., 2013). Therefore, understanding the mechanisms by which behaviors can be changed is a crucial first step in informing such policies. For example, our results suggest that when targeting Democrats on Democratic topics (e.g., support for gun control, engagement in climate action, or vaccination against COVID-19), belief change can be a viable strategy of achieving behavioral change. However, alternative strategies might need to be employed when targeting Democrats on Republican topics (e.g., support for anti-abortion laws) or when targeting Republicans on either Democratic or Republican topics.

References

Abrams, D., Wetherell, M., Cochrane, S., Hogg, M. A., & Turner, J. C. (1990). Knowing what to think by knowing who you are: Self-categorization and the nature of norm formation, conformity and group polarization. *British Journal of Social Psychology*, *29*(2), 97–119. https://doi.org/10.1111/j.2044-8309.1990.tb00892.x

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhi & J. Beckmann (Eds.), *Action—Control: From cognition to behavior* (pp. 11–39). Springer. https://doi.org/10.1007/978-3-642-69746-3_2

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Albarracín, D., Johnson, B. T., & Zanna, M. P. (2014). *The handbook of attitudes*. Psychology Press. https://doi.org/10.4324/9781410612823

Arnett, J. J. (2016). The neglected 95%: Why American psychology needs to become less American. In A. E. Kazdin (Ed.), *Methodological issues and strategies in clinical research* (pp. 115–132). American Psychological Association. https://doi.org/10.1037/14805-008

Bendixen, L. D. (2002). A process model of epistemic belief change. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 191–208). Lawrence Erlbaum.

Borge, M., Ong, Y. S., & Rosé, C. P. (2018). Learning to monitor and regulate collective thinking processes. *International Journal of Computer-Supported Collaborative Learning*, *13*(1), 61–92. https://doi.org/10.1007/s11412-018-9270-5

Broockman, D., & Kalla, J. (2022). *The impacts of selective partisan media exposure: A field experiment with Fox News viewers*. OSF Preprints. https://doi.org/10.31219/osf.io/jrw26

Bullock, J. G., Green, D. P., & Ha, S. E. (2010). Yes, but what's the mechanism?(don't expect an easy answer). *Journal of Personality and Social Psychology*, *98*(4), 550–558. https://doi.org/10.1037/a0018933

Centola, D. (2011). An experimental study of homophily in the adoption of health behavior. *Science*, *334*(6060), 1269–1272. https://doi.org/10.1126/science.1207055

Chung, S., Fink, E. L., & Kaplowitz, S. A. (2008). The comparative statics and dynamics of beliefs: The effect of message discrepancy and source credibility. *Communication Monographs*, *75*(2), 158–189. https://doi.org/10.1080/03637750802082060

Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology*, *55*(1), 591–621. https://doi.org/10.1146/annurev.psych.55.090902.142015

Coman, A., Momennejad, I., Drach, R. D., & Geana, A. (2016). Mnemonic convergence in social networks: The emergent properties of cognition at a collective level. *Proceedings of the National Academy of Sciences of the United States of America*, *113*(29), 8171–8176. https://doi.org/10.1073/pnas.1525569113

Connors, M. H., & Halligan, P. W. (2015). A cognitive account of belief: A tentative road map. *Frontiers in Psychology*, *5*, Article 1588. https://doi.org/10.3389/fpsyg.2014.01588

Coppock, A. (2019) Generalizing from survey experiments conducted on mechanical turk: A replication approach. *Political Science Research and Methods*, *7*(3), 613–628. https://doi.org/10.1017/psrm.2018.10

Cuc, A., Koppel, J., & Hirst, W. (2007). Silence is not golden: A case for socially shared retrieval-induced forgetting. *Psychological Science*, *18*(8), 727–733. https://doi.org/10.1111/j.1467-9280.2007.01967.x

Dovidio, J. F., & Esses, V. M. (2007). Psychological research and public policy: Bridging the gap. *Social Issues and Policy Review*, *1*(1), 5–14. https://doi.org/10.1111/j.1751-2409.2007.00002.x

Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Harcourt Brace Jovanovich College Publishers.

Eagly, A. H., & Chaiken, S. (2007). The advantages of an inclusive definition of attitude. *Social Cognition*, *25*(5), 582–602. https://doi.org/10.1521/soco.2007.25.5.582

Ecker, U. K., Lewandowsky, S., & Apai, J. (2011). Terrorists brought down the plane!—No, actually it was a technical fault: Processing corrections of emotive information. *Quarterly Journal of Experimental Psychology*, *64*(2), 283–310. https://doi.org/10.1080/17470218.2010.497927

Ecker, U. K., Lewandowsky, S., Swire, B., & Chang, D. (2011). Correcting false information in memory: Manipulating the strength of misinformation encoding and its retraction. *Psychonomic Bulletin & Review*, *18*(3), 570–578. https://doi.org/10.3758/s13423-011-0065-1

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Addison-Wesley.

Fishman, J., Yang, C., & Mandell, D. (2021). Attitude theory and measurement in implementation science: A secondary review of empirical studies and opportunities for advancement. *Implementation Science*, *16*(1), Article 87. https://doi.org/10.1186/s13012-021-01153-9

Frankel, R., & Swanson, S. R. (2002). The impact of faculty-student interactions on teaching behavior: An investigation of perceived student encounter orientation, interactive confidence, and interactive practice. *Journal of Education for Business*, *78*(2), 85–91. https://doi.org/10.1080/08832320209599703

Haas, I. J., & Cunningham, W. A. (2014). The uncertainty paradox: Perceived threat moderates the effect of uncertainty on political tolerance. *Political Psychology*, *35*(2), 291–302. https://doi.org/10.1111/pops.12035

Harrington, J. R., & Gelfand, M. J. (2014). Tightness-looseness across the 50 united states. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(22), 7990–7995. https://doi.org/10.1073/pnas.1317937111

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature*, *466*(7302), Article 29. https://doi.org/10.1038/466029a

Hochbaum, G. M. (1958). *Public participation in medical screening programs: A socio-psychological study* (No. 572). U.S. Department of Health, Education, and Welfare, Public Health Service, Bureau of State Services, Division of Special Health Services, Tuberculosis Program.

Jervis, R. (2006). Understanding beliefs. *Political Psychology*, *27*(5), 641–663. https://doi.org/10.1111/j.1467-9221.2006.00527.x

Larson, H. J., Cooper, L. Z., Eskola, J., Katz, S. L., & Ratzan, S. (2011). Addressing the vaccine confidence gap. *Lancet*, *378*(9790), 526–535. https://doi.org/10.1016/S0140-6736(11)60678-8

Litman, L., Robinson, J., & Abberbock, T. (2017). TurkPrime.com: A versatile crowdsourcing data acquisition platform for the behavioral sciences. *Behavior Research Methods*, *49*(2), 433–442. https://doi.org/10.3758/s13428-016-0727-z

Mangels, J. A., Butterfield, B., Lamb, J., Good, C., & Dweck, C. S. (2006). Why do beliefs about intelligence influence learning success? A social cognitive neuroscience model. *Social Cognitive and Affective Neuroscience*, *1*(2), 75–86. https://doi.org/10.1093/scan/nsl013

Nyhan, B., Porter, E., Reifler, J., & Wood, T. J. (2020). Taking fact-checks literally but not seriously? The effects of journalistic fact-checking on factual beliefs and candidate favorability. *Political Behavior*, *42*(3), 939–960. https://doi.org/10.1007/s11109-019-09528-x

Oxman, A. D., Bjørndal, A., Becerra-Posada, F., Gibson, M., Block, M. A. G., Haines, A., Hamid, M., Odom, C. H., Lei, H., Levin, B., Lipsey, M. W., Littell, J. H., Mshinda, H., Ongolo-Zogo, P., Pang, T., Sewankambo, N., Songane, F., Soydan, H., Torgerson, C., … Wibulpolprasert, S. (2010). A framework for mandatory impact evaluation to ensure well informed public policy decisions. *Lancet*, *375*(9712), 427–431. https://doi.org/10.1016/S0140-6736(09)61251-4

Paluck, E. L. (2009). What's in a norm? Sources and processes of norm change. *Journal of Personality and Social Psychology*, *96*(3), 594–600. https://doi.org/10.1037/a0014688

Pennycook, G., McPhetres, J., Zhang, Y., Lu, J. G., & Rand, D. G. (2020). Fighting COVID-19 misinformation on social media: Experimental evidence for a scalable accuracy-nudge intervention. *Psychological Science*, *31*(7), 770–780. https://doi.org/10.1177/0956797620939054

Poland, G. A., & Spier, R. (2010). Fear, misinformation, and innumerates: How the Wakefield paper, the press, and advocacy groups damaged the public health. *Vaccine*, *28*(12), 2361–2362. https://doi.org/10.1016/j.vaccine.2010.02.052

Porter, E., Wood, T. J., & Kirby, D. (2018). Sex trafficking, Russian infiltration, birth certificates, and pedophilia: A survey experiment correcting fake news. *Journal of Experimental Political Science*, *5*(2), 159–164. https://doi.org/10.1017/XPS.2017.32

Ratzan, S. C. (2010). Setting the record straight: Vaccines, autism, and the Lancet. *Journal of Health Communication*, *15*(3), 237–239. https://doi.org/10.1080/10810731003780714

Reimers, F., & McGinn, N. F. (1997). *Informed dialogue: Using research to shape education policy around the world*. Praeger/Greenwood.

Rosenstock, I. M. (1960). What research in motivation suggests for public health. *American Journal of Public Health and the Nation's Health*, *50*(3_Pt_1), 295–302. https://doi.org/10.2105/AJPH.50.3_Pt_1.295

Rosenstock, I. M. (1974). The health belief model and preventive health behavior. *Health Education Monographs*, *2*(4), 354–386. https://doi.org/10.1177/109019817400200405

Schwitzgebel, E. (2010). Acting contrary to our professed beliefs or the gulf between occurrent judgment and dispositional belief. *Pacific Philosophical Quarterly*, *91*(4), 531–553. https://doi.org/10.1111/j.1468-0114.2010.01381.x

Shariff, A. F., & Rhemtulla, M. (2012). Divergent effects of beliefs in heaven and hell on national crime rates. *PLOS ONE*, *7*(6), Article e39048. https://doi.org/10.1371/journal.pone.0039048

Slater, M. D., & Rouner, D. (1996). How message evaluation and source attributes may influence credibility assessment and belief change. *Journalism & Mass Communication Quarterly*, *73*(4), 974–991. https://doi.org/10.1177/107769909607300415

Snilstveit, B., Vojtkova, M., Bhavsar, A., & Gaarder, M. (2013). *Evidence gap maps—A tool for promoting evidence-informed policy and prioritizing future research*. The World Bank. https://doi.org/10.1596/1813-9450-6725

Southerland, S. A., Sinatra, G. M., & Matthews, M. R. (2001). Belief, knowledge, and science education. *Educational Psychology Review*, *13*(4), 325–351. https://doi.org/10.1023/A:1011913813847

Sulat, J. S., Prabandari, Y. S., Sanusi, R., Hapsari, E. D., & Santoso, B. (2018). The validity of health belief model variables in predicting behavioral change: A scoping review. *Health Education*, *118*(6), 499–512. https://doi.org/10.1108/HE-05-2018-0027

Swire, B., Berinsky, A. J., Lewandowsky, S., & Ecker, U. K. (2017). Processing political misinformation: Comprehending the Trump phenomenon. *Royal Society Open Science*, *4*(3), Article 160802. https://doi.org/10.1098/rsos.160802

Swire-Thompson, B., Ecker, U. K. H., Lewandowsky, S., & Berinsky, A. J. (2020). They might be a liar but they're my liar: Source evaluation and the prevalence of misinformation. *Political Psychology*, *41*(1), 21–34. https://doi.org/10.1111/pops.12586

Tajfel, H., & Turner, J. C. (2004). The social identity theory of intergroup behavior. In J. T. Jost & J. Sidanius (Eds.), *Political psychology* (pp. 276–293). Psychology Press.

Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving decisions about health, wealth, and happiness*. Penguin.

Tingly, D., Yamamoto, T., Hirose, K., Keele, L., & Imai, K. (2014). Mediation: R package for causal mediation. *Journal of Statistical Software*, *59*(5), 1–38. https://doi.org/10.18637/jss.v059.i05

Van Bavel, J. J., Harris, E. A., Pärnamets, P., Rathje, S., Doell, K. C., & Tucker, J. A. (2021). Political psychology in the digital (mis) information age: A model of news belief and sharing. *Social Issues and Policy Review*, *15*(1), 84–113. https://doi.org/10.1111/sipr.12077

Van Bavel, J. J., & Pereira, A. (2018). The partisan brain: An identity-based model of political belief. *Trends in Cognitive Sciences*, *22*(3), 213–224. https://doi.org/10.1016/j.tics.2018.01.004

Vlasceanu, M. (2022, June 22). *Political and non-political belief change elicits behaviour change*. https://osf.io/6rqkn

Vlasceanu, M., & Coman, A. (2018). Mnemonic accessibility affects statement believability: The effect of listening to others selectively practicing beliefs. *Cognition*, *180*, 238–245. https://doi.org/10.1016/j.cognition.2018.07.015

Vlasceanu, M., & Coman, A. (2022a). The impact of social norms on health-related belief update. *Applied Psychology. Health and Well-Being*, *14*(2), 453–464. https://doi.org/10.1111/aphw.12313

Vlasceanu, M., & Coman, A. (2022b). The impact of information sources on COVID-19 knowledge accumulation and vaccination intention. *International Journal of Data Science and Analytics*, *13*(4), 287–298. https://doi.org/10.1007/s41060-021-00307-8

Vlasceanu, M., Enz, K., & Coman, A. (2018). Cognition in a social context: A social-interactionist approach to emergent phenomena. *Current Directions in Psychological Science*, *27*(5), 369–377. https://doi.org/10.1177/0963721418769898

Vlasceanu, M., Goebel, J., & Coman, A. (2020). *The Emotion-induced belief amplification effect* [Paper presentation]. Proceedings of the Annual Meeting of the Cognitive Science Society. https://www.cognitivesciencesociety.org/cogsci20/papers/0076/0076.pdf

Vlasceanu, M., Morais, M. J., & Coman, A. (2021a). The effect of prediction error on belief update across the political spectrum. *Psychological Science*, *32*(6), 916–933. https://doi.org/10.1177/0956797621995208

Vlasceanu, M., Morais, M. J., & Coman, A. (2021b). Network structure impacts the synchronization of collective beliefs. *Journal of Cognition and Culture*, *21*(5), 431–448. https://doi.org/10.1163/15685373-12340120

Vlasceanu, M., Morais, M. J., Duker, A., & Coman, A. (2020). The synchronization of collective beliefs: From dyadic interactions to network convergence. *Journal of Experimental Psychology: Applied*, *26*(3), 453–464. https://doi.org/10.1037/xap0000265

Wheeler, S. C., Green, M. C., & Brock, T. C. (1999). Fictional narratives change beliefs: Replications of Prentice, Gerrig, and Bailis (1997) with mixed corroboration. *Psychonomic Bulletin & Review*, *6*(1), 136–141. https://doi.org/10.3758/BF03210821

Wood, T., & Porter, E. (2019). The elusive backfire effect: Mass attitudes' steadfast factual adherence. *Political Behavior*, *41*(1), 135–163. https://doi.org/10.1007/s11109-018-9443-y

Appendix A

Health-Related Statements

Accuracy	Statement
1. Accurate	Exposure to cockroach-infested buildings is a major cause of asthma in children.
2. Accurate	A child's untreated wandering eye can lead to permanent vision loss in that eye.
3. Accurate	Corporal punishment is associated with lower intelligence quotient in children.
4. Accurate	Herbal cold remedies are unsafe treatments for infants.
5. Inaccurate	Sitting too close to the TV damages children's vision.
6. Inaccurate	Reading in dim light can damage the eyes.
7. Inaccurate	Listening to classical music raises babies' intelligence quotient (IQ).
8. Inaccurate	Allergy shots are helpful for food allergies.

Note. TV = television.

(*Appendices continue*)

Appendix B

Politically Charged Statements

Accuracy	Identity	Statement
1. Accurate	Democratic	Millions of children in the United States have witnessed a shooting in the past year.
2. Accurate	Democratic	The Affordable Care Act saved the U.S. trillions of dollars.
3. Inaccurate	Democratic	All U.S. cities experience more extremely hot days compared to five decades ago.
4. Inaccurate	Democratic	Children raised by same-sex parents are just as likely to experience emotional problems compared to children raised by opposite-sex parents.
5. Accurate	Republican	Most noncitizen households in the United States access welfare programs.
6. Accurate	Republican	Hundreds of thousands of abortions in the United States are paid for with public funds each year.
7. Inaccurate	Republican	Hundreds of Americans in the United States are killed by foreign-born terrorists each year.
8. Inaccurate	Republican	Government regulations cost the United States billions of dollars each year.

Received February 25, 2022
Revision received June 22, 2022
Accepted August 18, 2022 ■