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Harm Hypervigilance in Public Reactions to Scientific Evidence

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Abstract

Two preregistered studies from two different platforms with representative U.S. adult samples (N = 1,865) tested the harm-hypervigilance hypothesis in risk assessments of controversial behavioral science. As expected, across six sets of scientific findings, people consistently overestimated others' harmful reactions (medium to large average effect sizes) and underestimated helpful ones, even when incentivized for accuracy. Additional analyses found that (a) harm overestimations were associated with support for censoring science, (b) people who were more offended by scientific findings reported greater difficulty understanding them, and (c) evidence was moderately consistent for an association between more conservative ideology and harm overestimations. These findings are particularly relevant because journals have begun evaluating potential downstream harms of scientific findings. We discuss implications of our work and invite scholars to develop rigorous tests of (a) the social pressures that lead science astray and (b) the actual costs and benefits of publishing or not publishing potentially controversial conclusions.

Keywords

harm avoidance, bias, risk perception, moral psychology, evolutionary psychology, metascience, open data, open materials, preregistered

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Many modern comforts and luxuries—from improved health care to space exploration—can be traced to scientific advances (Pinker, 2018), yet attitudes toward science reveal considerable ambivalence (e.g., Funk, 2020). Throughout history, people have worried about the potentially harmful implications and applications of scientific findings (Shattuck, 1997), which inevitably sways scientists' decisions about what (or what not) to study (Kempner et al., 2005). We tested the hypothesis that people systematically overestimate harmful reactions to behavioral science research.

Human cognition exhibits numerous systematic judgmental biases (Kahneman, 2011). Evolutionary theorists have, however, countered that some biases should be viewed not as bugs but as design features that promote fitness in environments in which certain errors are costlier than others (Haselton et al., 2016). For example, people are hyperactive agency detectors (Barrett, 2000). Failing to detect that a rustle in the bushes signals the presence of a predator (false negative) is costlier than concluding that the rustle was caused by a predator and unnecessarily elevating one's defenses (false positive), and so unexpected creaks and cracks put us on edge—usually erroneously.

Hyperactive agency detection is a subtype of bias toward *harm avoidance*. From a very young age, humans attend to threatening stimuli (LoBue et al., 2017). Losses and negative events have greater impact on human judgment than gains and positive events of similar magnitude (Baumeister et al., 2001; Rozin & Royzman, 2001; Tversky & Kahneman, 1991). Negative, morally charged information spreads quickly (Brady et al., 2020), and people more readily dole out judgments of bad than good moral character (Clark, 2022). People also overattribute ill

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intent to others (Pronin, 2008) and overestimate damage caused by intended harms (Ames & Fiske, 2015), others' reactivity to media content (Gunther, 1991), and the homogeneity and extremity of outgroups (Ahler & Sood, 2018). This cynicism coincides with harm sensitivities (Crockett et al., 2014; Kuran & Sunstein, 2007; Schein & Gray, 2015) and overestimations of risks faced by others (Rothman et al., 1996). These patterns suggest a cognitive tendency of hypervigilance toward bad outcomes. *Hypervigilance*, by definition, is excessive—more vigilance than necessary from a dispassionate, objective risk assessment. Nonetheless, people may still display hypervigilance because it is advantageous for fitness: Overreacting to potentially lethal threats is generally a less serious mistake than underreacting.

In science, information hazards are "risks that arise from the dissemination or the potential dissemination of true information that may cause harm or enable some agent to cause harm" (Bostrom, 2011, p. 44). For example, the COVID-19 pandemic renewed concerns about gain-of-function research (Imperiale & Casadevall, 2020). Behavioral scientists seldom must fret over their findings triggering harm on the scale of a global pandemic. Information hazards in behavioral science are mediated through human minds: The dissemination of knowledge influences beliefs and attitudes, which can lead to potentially harmful decision-making.

A couple of anecdotes illustrate how harm concerns can influence reactions to behavioral-science findings. A meta-analysis published in *Psychological Bulletin* found that the effects of child sexual abuse were not intensely or universally negative (Rind et al., 1998). Widespread concerns that the article approved of pedophilia prompted the American Psychological Association to affirm their condemnation of child sexual abuse and prepare amicus briefs to challenge efforts to use the data to condone sexual interactions between children and adults (Martin, 1999). A more recent (now retracted) study found that higher proportions of female senior collaborators were associated with lower postmentorship impact for female junior authors (AlShebli et al., 2020). Critics targeted the article's operationalizations of mentorship and impact (Mummery et al., 2020) but also raised concerns about potential harm to women in science. *Nature Communications* (2020) responded by affirming their commitment to equity and inclusion, announcing intentions to launch initiatives to support women mentors and stating that potential harms will henceforth be considered during the review process. Although we cannot know whether harm concerns contributed to the retraction decision, the potential for "undermin[ing] the role of female mentors and mentees" clearly influenced the response to the incident (as explicitly mentioned in the retraction notice appended to the AlShebli et al., 2020, article). These anecdotes demonstrate that—at least on occasion—people make assumptions about the potential harms of disseminating behavioral science.

On the basis of the hypervigilance-toward-harm argument, we tested the hypothesis that people overestimate harmful reactions to scientific findings. We also tested three secondary questions. First, because different groups have different moral concerns (Clark & Winegard, 2020; Graham et al., 2009; Tetlock et al., 2000) and different perceptions of threats (Fessler et al., 2017; Hibbing et al., 2014), we examined the potentially moderating effects of political ideology and perceived offensiveness on harm overestimations. Second, because moral concerns can activate cognitive and affective processes that disrupt baseline processing of information (e.g., Clark et al., 2015; Ditto et al., 1998; Kunda, 1990), we explored whether people evaluate offensive scientific findings as incomprehensible. Third, we sought to replicate previous research documenting that women are more censorious than men (e.g., Fisher et al., 1994; Lambe, 2004; Suedfeld et al., 1994). Although more research is needed on why this may be the case, one proposal is that women are more harm averse (Clark, 2021; Geary, 2010).

Statement of Relevance

Calls for the suppression of scientific research are often motivated by concerns about the potential dangers of scientific information. Yet people's intuitive assumptions about possible harms may not be well calibrated. Across two studies, participants read short discussions of six scientific findings with potentially controversial implications. One group reported what they thought should be done in response to the findings (e.g., nothing, conduct more research, license harmful actions, provide help to relevant people). Another group estimated the percentage of people who supported each reaction. We found that people consistently overestimated others' harmful and underestimated others' helpful reactions to scientific findings. Furthermore, these tendencies were associated with greater support for scientific censorship. Because failing to correct both underestimates and overestimates of risks can be maladaptive, we encourage researchers to find effective ways of preventing the misuse of scientific research while minimizing obstacles to scientific progress and evidence-based policy.

Open Practices Statement

Study 1 (https://aspredicted.org/nj8xn.pdf) and Study 2 (https://aspredicted.org/4ee9c.pdf) were preregistered. Procedures were followed and analyses were completed exactly as described in our preregistrations. Data for both studies have been made publicly available at OSF (https://osf.io/5vysk/). The Supplemental Material available online contains the full Qualtrics survey for all studies with verbatim stimulus materials and questions. All studies that were conducted to test the current hypotheses are reported—there were no file-drawer studies. However, the Supplemental Material contains full methods and results for Supplemental Study 1, which was an initial test of the harm-hypervigilance hypothesis. This study provided robust support for harm hypervigilance, but it had a methodological flaw that warranted it more suitable for the Supplemental Material than the main text.

Study 1

Method

This research was approved by the University of Pennsylvania Institutional Review Board.

Participants. Using Prime Panels on CloudResearch (Litman et al., 2017), we collected a nationally representative sample of U.S. adults (with demographic quotas for age, gender, race, and ethnicity). We recruited 880 participants, but CloudResearch overfilled the study, and we ended up with 983 participants (481 male, 487 female, 13 nonbinary, two undisclosed; age: M = 45.95 years, SD = 18.19). Participants were politically centrist on average (M = 52.14, SD = 29.48).

Procedure. Participants read excerpts from discussion sections of five real scientific studies published in academic journals and one discussion-section excerpt made up for purposes of the present research. We selected studies with diverse findings. Two articles were selected to be of particular concern to people who are more liberal. Accordingly, one reported that female protégés benefit more when they have male than female mentors (henceforth referred to as the "women-mentors" findings; AlShebli et al., 2020), and the other reported an absence of evidence of racial discrimination against ethnic minorities in police shootings (henceforth, the "police-discrimination" findings; D. J. Johnson et al., 2019). We selected these articles because they deal with the challenges of historically disadvantaged groups, which tend to be of greater concern for people who are more liberal (Purser & Harper, 2023; Winegard et al., 2021).

Two additional articles were selected as likely to be of more concern to people who are more conservative: One reported that activating Christian concepts increases racial prejudice (henceforth, the "Christian-prejudice" findings; M. K. Johnson et al., 2010), and the other reported that children with same-sex parents are no worse off than children with opposite-sex parents (henceforth, the "same-sex-parents" findings; Wainright et al., 2004). We selected these articles because they address matters of Christianity and same-sex parenting, which tend to be of greater concern for people who are more conservative (Crawford et al., 2013; Hanania & Trager, 2021).

We also included a finding that we expected would cause concern across the ideological spectrum: namely, that experiencing child sexual abuse does not cause severe and long-lasting psychological harm for all victims (henceforth, the "child-sexual-abuse" findings; Rind et al., 1998). Given that this article diminishes the impact of harm on survivors of childhood sexual abuse, we expected that all participants would find it concerning. These five studies were published in high-impact scientific journals, but the two "liberal-offensive" studies have since been retracted, and the "everyone-offensive" study was officially condemned by Congress (although not retracted).

We also included a sixth scientific finding that was fabricated to manipulate offense and ideological significance more cleanly. This sixth scientific finding described research that was experimentally manipulated to paint an unflattering picture of people who are either more liberal or more conservative. Each participant was randomly assigned to one of the two conditions, and all read the following text:

> Across three studies, we found that more [left-wing/right-wing] political ideology was associated with more intolerance toward attitudinally dissimilar others. In Study 1, as participants identified as more politically liberal/conservative, they reported less willingness to (1) talk to, (2) listen to, (3) meet, and (4) live by those who did not share their own political ideology. In Study 2, in a democratic decision-making task, political [liberals/conservatives] put less weight on the votes of moderates and [conservatives/liberals] than the votes of [liberals/conservatives], whereas [conservatives/liberals] equally weighted the votes of all ideological group members. Study 3 replicated these patterns in the United Kingdom, Sweden, Hungary, and New Zealand. These results suggest that political [liberals/conservatives] are less able or willing to consider views and values of those who disagree with them than are political [conservatives/liberals].

To ensure comprehension, immediately following each new finding, we asked participants to select which of three one-sentence descriptions best summarized the study's results. They could not progress in the study until they selected the correct one.

For each set of findings, each participant then read approximately 10 possible behavioral reactions and was randomly assigned either to (a) report whether they would support each action on a simple dichotomous scale ("I would not support this action or I would support this action") or (b) predict the percentage of people in a demographically representative sample of U.S. adults who would support each action on a scale from 0% to 100%. This allowed us to compare the estimated percentages of support with the true percentages of support, and thus overestimations were operationalized as the extent to which participants overestimated the true percentages of support (and underestimations as the extent to which participants underestimated the true percentages of support). Participants who reported their own support were used as a baseline comparison (i.e., the true percentage of support) for participants who estimated the percentage of support. For this reason, instead of evenly distributing participants across the two conditions, we randomly assigned one third to the former condition and two thirds to the latter, leaving approximately 600 participants in the primary analyses. This sample size allowed us to detect a Cohen's *d* of ~0.15 with 95% power (determined via *G*Power*; Faul et al., 2007) for our main hypothesis.

Among these 10 behavioral reactions, three were considered "harmful," two were considered "helpful," two involved "more research," two involved "thwart research," and one was "do nothing/ignore this research." Thus, there were five kinds of behavioral reactions: harmful, helpful, more research, thwart research, do nothing. Examples of harmful reactions across the five findings include "Discourage young females from approaching female mentors," "Stop investigating cases of police use of force against ethnic minorities," "Discourage people from joining the Christian faith," "Devalue families with one mother and one father," "Take child sexual abuse less seriously," and "Block [liberals/conservatives] from running for office." Reactions asking for more research involved conducting more research to understand why the pattern was found and to design interventions. Helpful reactions involved providing resources and investing in programs to help the group in question. Reactions asking to thwart the research involved banning the research and publicly shaming the associated scholars. See Table S2 in the Supplemental Material for verbatim phrasing of each behavioral reaction.

A posttest, in which 222 CloudResearch participants ranked each reaction on a continuous scale from 0, *Extremely harmful*, to 100, *Extremely helpful* (see the Supplemental Material for full details), confirmed that laypeople considered all harmful reactions as harmful except for one of the three items for the same-sex-parents findings. However, because the alpha indicated sufficient reliability and we sought to adhere to our preregistered plan, we retained this item. Nonetheless, we suspect that it added some noise to the results for the harmful reactions to the same-sex-parents findings. The posttest confirmed that all helpful reactions were viewed as helpful. Additionally, more-research reactions were evaluated as helpful, whereas thwart-research and do-nothing reactions were evaluated as harmful.

After completing the behavioral-response questions, participants reported how difficult the research was to understand on a 7-point scale from 1, *Extremely easy*, to 7, *Extremely difficult*. Participants then reported whether they found the results to be offensive, concerning, and problematic on 7-point scales from 1, *Not at all*, to 7, *Extremely*, which were combined into an "offensiveness" index. As indicated in the preregistration (Question 8), we hypothesized that perceived offensiveness of the findings would be associated with reported difficulty understanding the findings.

As an attention check, we asked participants to report whether they answered questions about (a) what we should do, (b) what other people would do, or (c) what policymakers have done. As indicated in the preregistration, no exclusions were made for our primary analyses. Participants misidentifying the kinds of questions they were asked would only attenuate any effect.[1]

To conduct an exploratory test of a potential predictor of more accurate estimations of behavioral reactions, we assessed the political homogeneity of participants' social networks with the following item: "Thinking of the 100 people in your life to whom you feel closest (e.g., friends, family, colleagues), what percentage of those people generally share your political ideology?" Answers were reported on a scale from 0% to 100%. We tested whether more politically heterogenous social networks were associated with more accurate predictions because past work has suggested that political homogeneity in friendships increases misperceptions (More in Common, 2019). If true, this might also suggest a link between harm hypervigilance toward scientific findings and avoidance of ideologically dissimilar others.

Participants also answered demographic questions about their gender, age, political ideology (sliding scale from 0, *Extremely liberal*, to 100, *Extremely conservative*) and highest level of education obtained (six

options from *high school or less* to *doctoral degree or equivalent*). Participants were also asked whether they believe that some scientific findings should be censored because they are too dangerous (scale from 1, *Definitely not*, to 7, *Yes, definitely*). As indicated in the preregistration (Question 8), we expected women to endorse censorship more strongly than men. Last, participants reported whether they had heard of each study before and were presented with the five study topics (response options *no*, *maybe*, and *yes*).

Results

Harm hypervigilance. Following our preregistration, we tested harm hypervigilance using 30 single-sample *t* tests comparing the estimated percentages of support

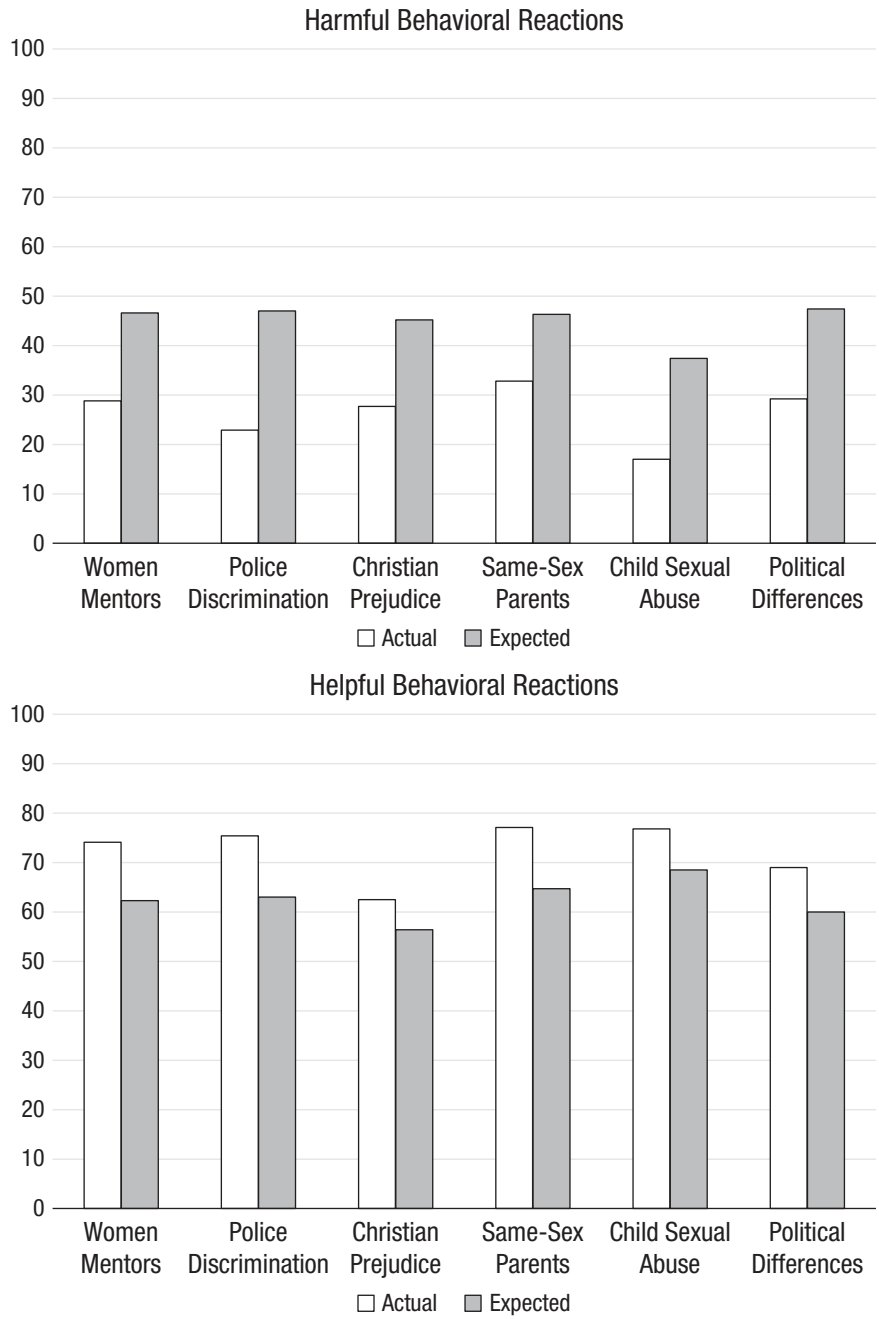

Fig. 1. *(continued on next page)*

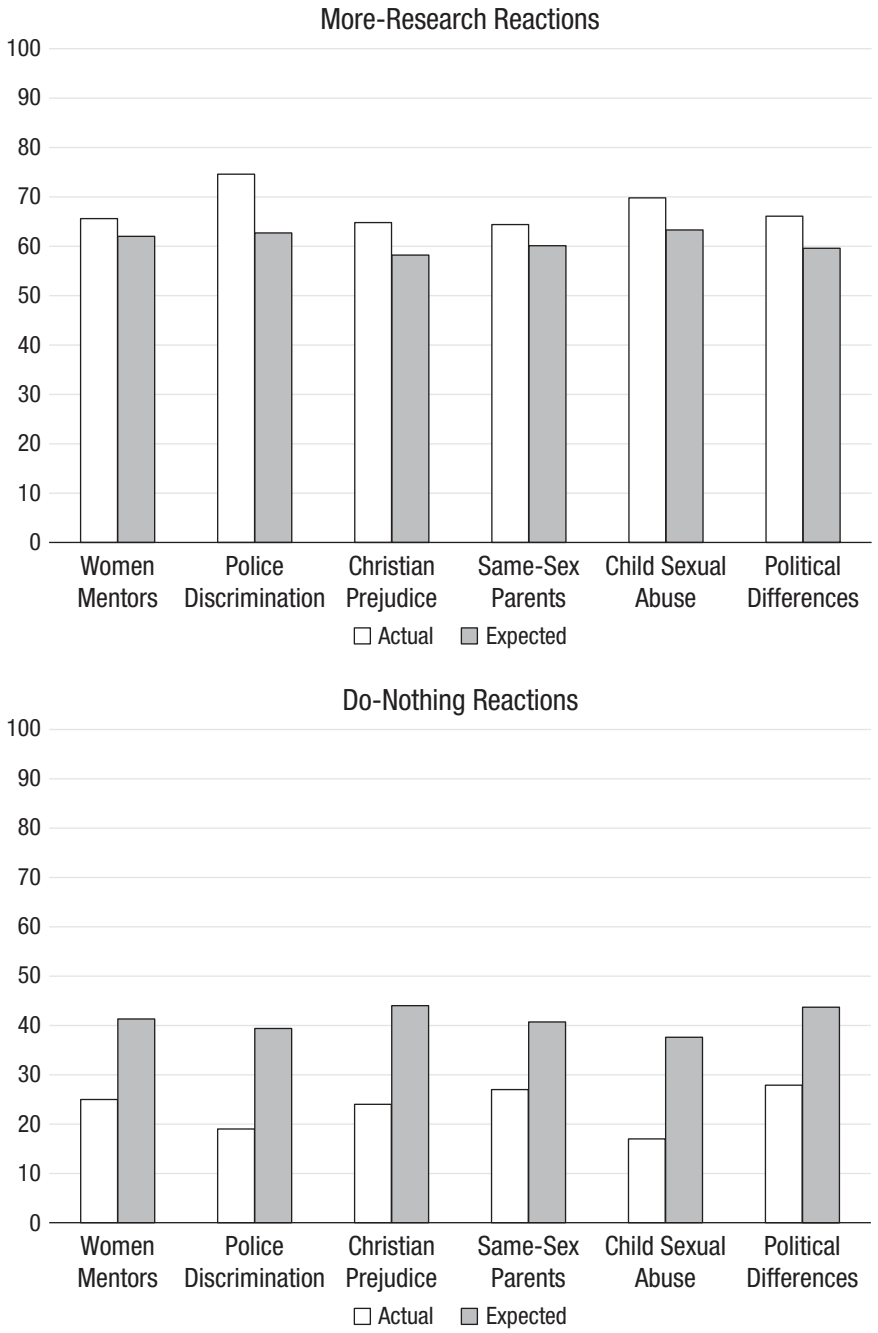

Fig. 1. *(continued on next page)*

with the true percentages of support. Percentages of expected support and actual support for each reaction type for each set of scientific findings are visualized in Figure 1. The findings were virtually identical to our preregistered hypotheses. As Table 1 shows, participants overestimated harmful reactions to all six findings (medium to very large effect sizes).

We did not preregister hypotheses for the other kinds of behavioral reactions, but in nearly all cases, the results were conceptually consistent with the harm-hypervigilance hypothesis. Participants underestimated helpful reactions and more-research reactions to all six findings (small to medium effects). In addition, participants overestimated thwart-research and do-nothing

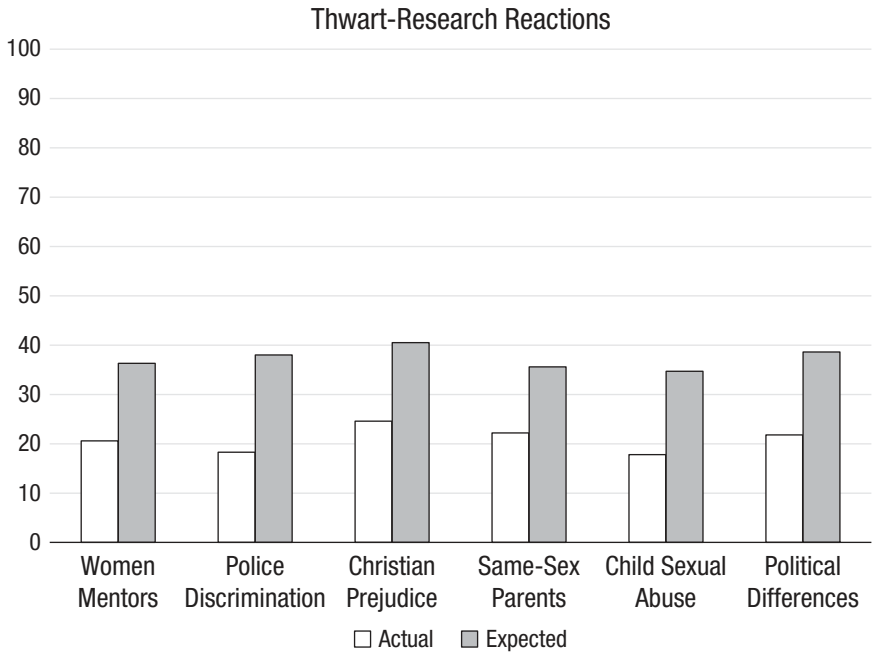

Fig. 1. Percentage of actual support and expected support for each of six scientific findings, separately for each of five reaction types in Study 1.

reactions to all six findings (roughly medium effects). Thus, participants overestimated all reactions that were considered harmful and underestimated all reactions that were considered helpful.

Is harm hypervigilance related to moral and political concerns? We subtracted true percentages from estimated percentages for each reaction type and tested the correlations between difference scores and (a) offense and (b) ideology. As Table 2 shows, offensiveness was weakly associated with overestimations of harmful reactions to the women-mentors and police-discrimination findings but mostly unrelated for the other findings. Higher offensiveness was consistently associated only with overestimations of thwart-research and do-nothing reactions.

For all findings except the same-sex-parents findings, there were significant associations between ideology and harm overestimations; specifically, higher conservatism was associated with larger harm overestimations. To probe explanations for this pattern, we tested the correlations between perceived offensiveness of each set of findings and ideology. There were positive associations between conservatism and offensiveness of the Christian-prejudice findings ($r = .10$, $p = .001$; offensiveness: $M = 3.83$) and same-sex-parents findings ($r = .25$, $p < .001$; offensiveness: $M = 2.94$), but conservatism was unrelated to perceived offensiveness of the child-sexual-abuse findings ($r = .01$, $p = .853$; offensiveness: $M = 3.85$), the women-mentors findings ($r = .01$, $p = .838$; offensiveness: $M = 3.47$), and the police-discrimination findings ($r = -.04$, $p = .217$; offensiveness: $M = 3.55$). Conservatism was also weakly associated with greater perceived offensiveness of the political-intolerance findings ($r = .07$, $p = .037$; offensiveness: $M = 3.63$). Thus, none of the scientific findings were perceived as more offensive to people with more liberal versus conservative views. As with the offensiveness findings, there also were significant associations between conservatism and overestimations of thwart-research and do-nothing reactions (with one exception for the same-sex-parents findings).

Political intolerance. For the political-intolerance findings, the experimental manipulation and ideology generally had no associations with overestimations of any behavioral reactions, $|\text{semipartial } rs| < .10$, and so these results are reported only in the Supplemental Material (under "Political Intolerance Findings"). The one exception was that political conservatism predicted overestimations of thwart-research reactions, semipartial $r = .17$, $p < .001$.

Incomprehension. As hypothesized, across all six findings, offensiveness was associated with reported difficulty understanding the findings (generally small to medium effects), $rs = .12–.32$, $ps < .008$. The one exception arose when liberalism was associated with intolerance. The relationship was in the same direction but not significant, $r = .06$, $p = .217$.

Table 1. Tests of the Differences Between Expected and Actual Support for Each Reaction Type to Each Set of Findings in Study 1

Reaction type and finding	*t*	*p*	*d*
Harmful reactions (*n* = ~608)			
Women mentors	17.73	< .001	0.72
Police discrimination	24.05	< .001	0.97
Christian prejudice	16.09	< .001	0.65
Same-sex parents	13.80	< .001	0.56
Child sexual abuse	17.74	< .001	0.72
Political intolerance	17.40	< .001	0.71
Helpful reactions (*n* = ~607)			
Women mentors	–11.21	< .001	–0.45
Police discrimination	–12.12	< .001	–0.49
Christian prejudice	–5.61	< .001	–0.23
Same-sex parents	–12.23	< .001	–0.50
Child sexual abuse	–8.07	< .001	–0.33
Political intolerance	–8.78	< .001	–0.36
More-research reactions (*n* = ~607)			
Women mentors	–3.68	< .001	–0.15
Police discrimination	–11.43	< .001	–0.46
Christian prejudice	–5.94	< .001	–0.24
Same-sex parents	–4.10	< .001	–0.17
Child sexual abuse	–6.34	< .001	–0.26
Political intolerance	–6.43	< .001	–0.26
Thwart-research reactions (*n* = ~606)			
Women mentors	13.11	< .001	0.53
Police discrimination	16.51	< .001	0.67
Christian prejudice	13.19	< .001	0.53
Same-sex parents	11.19	< .001	0.45
Child sexual abuse	13.89	< .001	0.56
Political intolerance	14.25	< .001	0.58
Do-nothing reactions (*n* = ~602)			
Women mentors	13.08	< .001	0.53
Police discrimination	16.64	< .001	0.68
Christian prejudice	15.38	< .001	0.62
Same-sex parents	10.96	< .001	0.45
Child sexual abuse	15.83	< .001	0.64
Political intolerance	12.70	< .001	0.52

Note: Positive effect sizes indicate overestimations, and negative effect sizes indicate underestimations.

Censorship. Our final preregistered hypothesis was that women would be more censorious than men. However, women were no more censorious, $M = 3.63$, $SD = 1.94$, than men, $M = 3.55$, $SD = 2.06$, $t(966) = -0.59$, $p = .558$. We had no preregistered hypotheses for demographic predictors for censorship, but younger respondents, $r = -.17$, $p < .001$, and more conservative ones, $r = .17$, $p < .001$, were more supportive of censorship. Education was unrelated to censorship support, $r = .05$, $p = .156$.

In exploratory analyses, we tested relationships between broad support for censorship and (a) harm overestimations, (b) offense to research, and (c) desires to thwart research. Across all six sets of scientific findings, larger harm overestimations, *r*s = .18–.28, *p*s < .001; more offense, *r*s = .15–.31, *p*s < .001; and stronger desires to thwart research, *r*s = .24–.33, *p*s < .001, were associated with support for censorship. People who broadly believed that some science should be censored because it is too dangerous were more likely to overestimate harmful reactions to scientific findings, be more offended by scientific findings, and support banning research and publicly shaming scholars for their research.

Harm overestimations and ingroup ideological homogeneity. In exploratory analyses, we tested the relationships between overestimations and underestimations of each reaction type for each set of scientific findings and the political homogeneity of participants' social networks (the percentage of their 100 closest others that share their ideology). Social network homogeneity predicted higher estimations of every single reaction to every single set of findings: *r*s = .20–.26, *p*s < .001 for harm reactions; *r*s = .26–.33, *p*s < .001 for helpful reactions; *r*s = .23–.34, *p*s < .001 for more-research reactions; *r*s = .15–.22, *p*s < .001 for thwart-research reactions; and *r*s = .14–.19, *p*s < .001 for do-nothing reactions. Because people tended to underestimate all positive reactions (helpful and more research) and overestimate all negative reactions (harmful, thwart research, and do nothing), this means that people with more politically heterogeneous social networks were more accurate in estimating the frequency of negative reactions, whereas people with more homogenous networks were more accurate in estimating the frequency of positive reactions.

Study 2

Method

One question raised by reviewers was whether participants in Study 1 were responding sincerely—or downplaying their own support for harmful reactions or exaggerating the harmful reactions of others for self-enhancing or strategic moral reasons. Study 2 tested these alternative explanations by incentivizing honest reports. This study was preregistered (https://aspredicted.org/4ee9c.pdf). Procedures and analyses were followed exactly as described in our preregistration.

Participants. We collected a nationally representative sample of U.S. adults on Prolific Academic. We requested 880 participants and received 882 (428 male, 444 female,

Table 2. Correlations Between Overestimations of Each Reaction Type to Each Set of Findings and Perceived Offensiveness and More Conservative Ideology in Study 1

	Correlation with offensiveness		Correlation with ideology	
Reaction type and finding	*r*	*p*	*r*	*p*
Harmful-reactions overestimations (*n* = ~607)				
Women mentors	.08	.067	.21	< .001
Police discrimination	.10	.012	.16	< .001
Christian prejudice	–.04	.288	.13	.001
Same-sex parents	.02	.597	.03	.517
Child sexual abuse	.06	.178	.22	< .001
Political intolerance	.05	.250	.15	< .001
Helpful-reactions overestimations (*n* = ~606)				
Women mentors	.04	.356	.03	.504
Police discrimination	.08	.039	.03	.521
Christian prejudice	.00	.918	.03	.486
Same-sex parents	–.12	.004	.04	.283
Child sexual abuse	.04	.357	.08	.055
Political intolerance	.06	.178	.02	.596
More-research-reactions overestimations (*n* = ~606)				
Women mentors	.05	.209	.02	.610
Police discrimination	.09	.030	.04	.384
Christian prejudice	–.03	.406	–.01	.864
Same-sex parents	–.05	.272	.01	.854
Child sexual abuse	.04	.290	.06	.134
Political intolerance	.01	.835	.00	.919
Thwart-research-reactions overestimations (*n* = ~605)				
Women mentors	.16	< .001	.17	< .001
Police discrimination	.21	< .001	.13	.002
Christian prejudice	.12	.002	.13	.002
Same-sex parents	.31	< .001	.15	< .001
Child sexual abuse	.21	< .001	.16	< .001
Political intolerance	.14	< .001	.22	< .001
Do-nothing-reactions overestimations (*n* = ~604)				
Women mentors	.10	.014	.09	.028
Police discrimination	.08	.038	.11	.005
Christian prejudice	.11	.008	.10	.013
Same-sex parents	.18	< .001	.04	.277
Child sexual abuse	.09	.024	.13	.001
Political intolerance	.09	.022	.10	.019

nine nonbinary, two undisclosed; age: M = 45.75 years, SD = 16.61). Participants leaned left on average (M = 36.24, SD = 29.79).

Procedure. Procedures were similar to those in Study 2 with two main exceptions. First, because this study would be slightly more cognitively demanding, we scaled the study back to include only three scientific findings (police discrimination, Christian prejudice, child sexual abuse) and only the harmful and helpful reactions (so no longer the more-research, do-nothing, and thwart-research reactions). Second, we increased the stakes for both sets of participants—those reporting their own behavioral reactions and those estimating the behavioral reactions of others. In the former group, we turned each behavioral reaction into an ostensible initiative that we could donate to on participants' behalf. Participants were told the following:

> In response to scientific findings, it is common for policy-makers and charitable organizations to support initiatives that are informed by those scientific

findings. After you read each set of scientific findings, we will present you with five such initiatives to which you can vote 'yes' or 'no' to allocate $100, for up to $500 total. At the conclusion of the study, if the majority of participants vote 'yes' to allocate $100 to any particular initiative, we (the research team) will donate $100 toward that initiative.

For each behavioral reaction, participants selected either "No, do not donate $100" or "Yes, donate $100." Some behavioral reactions were phrased in ways that would seem odd as initiatives, so to increase believability that these reactions were real initiatives, we rephrased any that would seem unusual while retaining the meaning of the original reaction. For example, instead of "blame ethnic minorities for police use of force against them," we rephrased this initiative to "Encouraging ethnic minorities to take full responsibility for police use of force against them." Verbatim materials can be found in the Supplemental Material (under "Qualtrics Study 3").

Participants who were asked to estimate others' behavioral reactions were informed about this former set of participants and asked to predict the percentage who voted "yes" to donate. And these participants were incentivized for accuracy with monetary prizes.

In response to scientific findings, it is common for policy-makers and charitable organizations to support initiatives that are informed by those scientific findings.

In another version of this study, participants were presented with five initiatives for each set of scientific findings and asked to vote on whether to allocate $100 to each initiative, for up to $500 total. They were informed that if the majority of participants voted 'yes' to allocate $100 to any particular initiative, we (the research team) would donate $100 toward that initiative. These participants were a demographically representative sample from the United States.

Your task is to predict the percentage of these participants who voted 'yes' to allocate $100 for each initiative. Or in other words, what percentage of people wanted to support each initiative? At the conclusion of this study, we will compute an accuracy score for you and all other participants (by totaling the absolute values of the differences between the true percentages and your predicted percentages) and award a $100 Amazon gift card to the five most accurate participants.

This task did not use deception; we did award $100 to each of the five most accurate participants. However, we used deception on the first group. The initiatives they evaluated were not real, so we could not actually donate to them. For this group, we included an unobtrusive skepticism probe to confirm that they really believed donations would be made. Directly asking participants whether they believed we were really going to make donations might create suspicions that were not present during the task. Instead, we asked them to estimate the percentage of initiatives they thought we would end up donating to on a sliding scale from 0% to 100%. Participants who were skeptical and thought no donations would be made were asked to select 0%. Only 1.4% of participants selected 0%, indicating that most participants believed some donations would be made and the stakes seemed real. See the Supplemental Material for a full description. At the end of the study, we debriefed participants by informing them that the charitable causes were made up for purposes of this study and that no donations would be made.

Results

Harm hypervigilance. Following our preregistration, we tested harm hypervigilance using six single-sample *t* tests comparing the estimated percentages of donations with the true percentages of donation. Figure 2 shows the percentages of expected support and actual support for each reaction type for each set of scientific findings. With this improved study design, the findings were virtually identical to those of Study 1 and consistent with our preregistered hypotheses. As Table 3 shows, participants overestimated harmful reactions to all three findings (small/medium to medium/large effect sizes). As in Study 1, participants also underestimated helpful reactions to the police-discrimination and child-sexual-abuse findings (small/medium to medium/large effect sizes). However, in contrast to participants in Study 1, those in Study 2 were relatively accurate in estimating helpful reactions to the Christian-prejudice findings, $d = 0.02$.

Is harm hypervigilance related to moral and political concerns? We subtracted true percentages from estimated percentages for each reaction type and tested the correlations between the difference scores and (a) offense and (b) ideology. As Table 4 shows, offensiveness was weakly associated with underestimations of harmful reactions to all three sets of findings. Similar to the results of Study 1, those of Study 2 showed that more conservative ideology was associated with larger harm overestimations for the police-discrimination findings, $r = .12$, $p = .003$, and to a weaker (and not significant) extent, the child-sexual-abuse findings, $r = .08$, $p = .070$. However, ideology was unrelated to harm overestimations for the Christian-prejudice findings.

Incomprehension. As hypothesized, across all three findings, offensiveness was associated with reported difficulty understanding the findings (generally small effects), *r*s = .07–.11, *p*s < .035.

Censorship. As hypothesized, women were more censorious, *M* = 2.92, *SD* = 1.67, than men, *M* = 2.45, *SD* = 1.74, *t*(870) = –4.06, *p* < .001. There was a small and nonsignificant relationship between younger age and censoriousness, *r* = –.06, *p* = .077. Ideology and education were mostly unrelated to censoriousness, |*r*s| < .06, *p*s > .15.

We again tested relationships between broad support for censorship and (a) harm overestimations and (b) offense to research. Across all three sets of scientific findings, larger harm overestimations, *r*s = .08–.16, *p*s < .049, and more offense, *r*s = .15–.24, *p*s < .001, were both associated with support for censorship. People who believed that some science should be censored because it is too dangerous were more likely to overestimate harmful reactions to scientific findings and to be offended by scientific findings.

Harm overestimations and ingroup ideological homogeneity. In exploratory analyses, we tested the relationships between overestimations and underestimations of each reaction type within each set of scientific findings and the political homogeneity of participants' social networks (the percentage of their 100 closest others that share their ideology). Unlike in Study 1, social network homogeneity was not associated with overestimations, *p* > .181.

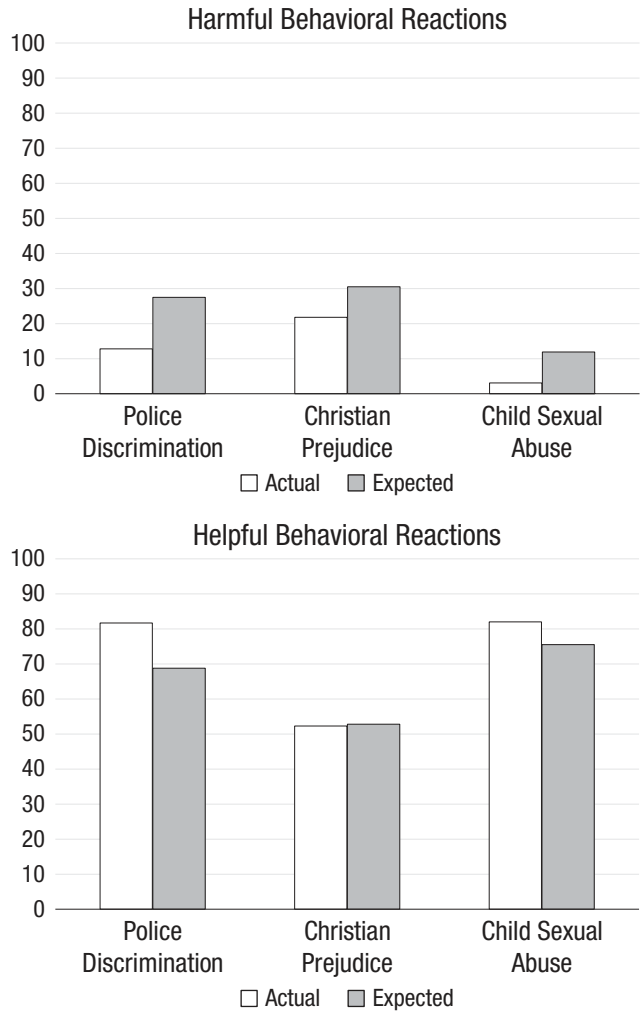

Fig. 2. Percentage of actual support and expected support for each of three scientific findings, separately for harmful and helpful reactions in Study 2.

General Discussion

Across two preregistered studies, we asked one group of participants to report how they thought the other group would react to six research findings with potentially controversial implications. Our studies revealed a robust and replicable main effect for our primary hypothesis. People overestimated others' harmful reactions to all six findings (medium to large effects). Similarly, people overestimated support for all reactions considered harmful (e.g., ban the research) and underestimated all reactions considered helpful (e.g., invest in programs to help the group in question). Although people accurately predicted that helpful reactions were more supported than harmful ones, their deviation from accuracy was consistently in the negative direction: People overpredicted the costs and underpredicted the benefits. Harm overestimations were also consistently associated with stronger desires to censor science.

Among secondary findings, conservatism was associated with larger harm overestimations in six out of nine correlations tested, consistent with previous research finding that conservatism is associated with a negativity bias (e.g., Hibbing et al., 2014). However, these patterns have also been challenged by more recent work (e.g., Johnston & Madson, 2022). Future research should test harm overestimations across a wider set of scientific findings to explore whether conservatism is consistently associated with a stronger, across-the-board tendency to overestimate the harmfulness of science (e.g., Everett et al., 2021)—or whether the pattern reverses when findings more strongly tap into liberal concerns (e.g., Washburn & Skitka, 2018).

We also observed that people more offended by scientific findings reported greater difficulty understanding them. This finding may relate to the philosophical concept of "dismissive incomprehension," the tendency to deflect dissonant claims by characterizing them as incomprehensible (Cull, 2019). Our results were only

Table 3. Tests of the Differences Between Expected and Actual Support for Each Reaction Type to Each Set of Findings in Study 2

Reaction type and finding	*t*	*p*	*d*
Harmful reactions (n = 582)			
Police discrimination	17.28	< .001	0.72
Christian prejudice	10.08	< .001	0.42
Child sexual abuse	12.86	< .001	0.53
Helpful reactions (n = 582)			
Police discrimination	–15.36	< .001	–0.64
Christian prejudice	0.48	.629	0.02
Child sexual abuse	–7.62	< .001	–0.32

correlational, so future research should explore the causal direction to test whether this is a motivated tendency (i.e., claiming incomprehensibility to undermine undesirable findings) or whether this pattern just reflects a struggle to reconcile unexpected findings with one's current understanding of the world. For example, scholars might be able to experimentally disentangle the role of moral offensiveness, novelty/plausibility, and complexity as drivers of this relationship.

Finally, we observed mixed findings regarding gender and censorship endorsement: Women were more censorious in Study 2 (as well as in our Supplemental Study) but not in Study 1. Given these mixed results, future research should continue examining this relationship to identify conditions under which men or women might be more censorious.

Limitations and future directions

Support for the harmful reactions—although overestimated—was not nonexistent. In some cases, close to 30% of participants supported reactions broadly considered harmful (e.g., block liberals/conservatives from running for office). We did not examine whether and how those reactions manifest in the real world or how to mitigate their negative effects. We also did not assess baseline percentages of people who support these reactions without exposure to research and so cannot know whether exposure to controversial findings increases certain risks. Future research should test these possibilities.

Future research should also explore the underlying drivers of harm hypervigilance. For example, self-serving bias remains a plausible explanation (e.g., Campbell & Sedikides, 1999). If the effect diminishes when the stakes for accuracy and genuine responding are even higher, it might suggest that there is self-serving bias on the part of people reporting their own behavioral reactions or strategic exaggeration of harms on the part of those predicting behavioral reactions. Alternatively, scholars could test whether these patterns increase under public (vs. private) evaluations, which would also be suggestive of self-serving bias. The theoretical rationale for our hypotheses—that humans may have evolved harm hypervigilance because of asymmetric error costs—is only one possibility.

Finally, future research should test the generalizability of these findings to other populations. For example, variation in trust in science and governments across countries (e.g., Rabesandratana, 2019) or other cultural or demographic differences may well influence hypervigilance to research. It would be informative to test the generalizability of these findings across a broader set of stimulus materials, contexts, and consequences. For example, do peer reviewers, science journal editors, and science-based policymakers also display harm hypervigilance toward a broad array of scientific findings? And if so, does this impact their decision-making? We invite other scholars to explore viewpoint variation among experts in their estimates of the costs and

Table 4. Correlations Between Overestimations of Each Reaction Type to Each Set of Findings and Perceived Offensiveness and More Conservative Ideology in Study 2

	Correlation with offensiveness		Correlation with ideology	
Reaction type and finding	*r*	*p*	*r*	*p*
Harmful-reactions overestimations (n = 582)				
Police discrimination	–.10	.021	.12	.003
Christian prejudice	–.10	.017	–.02	.609
Child sexual abuse	–.17	< .001	.08	.070
Helpful-reactions overestimations (n = 582)				
Police discrimination	.03	.511	.06	.170
Christian prejudice	.00	.957	–.07	.075
Child sexual abuse	.09	.030	–.02	.571

benefits of publishing (vs. not publishing) controversial conclusions. Our individual intuitions are likely to be both noisy and biased (Kahneman et al., 2021)—a powerful reason for adopting a systematic approach to calibrating our professional judgments of risks and benefits of science.

Implications for metascience

Our work highlights the complexities of evaluating the harm potential of scholarship (see, e.g., Nature Human Behaviour Editorial, 2022)—what is seen as helpful versus harmful may be systematically biased toward anticipating more positive than negative outcomes. Of course, even highly unlikely harms can have catastrophic cascading effects, and concerns about data legitimizing fringe views and causing harm are not unfounded (as evident from the infamously erroneous thesis linking vaccines to autism). The counterargument, however, is that censoring potentially harmful conclusions (and particularly if "harm potential" is systematically overestimated) may undermine trust in science, an institution that has drastically improved the lives of humans over the last few centuries precisely because of its resolute pursuit of truth (Pinker, 2018). Suppressing undesirable observations can prevent future research from further clarifying these conclusions and searching for remedies. (Of course, we could ourselves be overestimating the harms of harm overestimations.)

Both underestimating and overestimating risks can be maladaptive by misallocating resources and reducing vigilance to imminent real threats (Kuran & Sunstein, 2007). Similar forces might influence how laypeople, scientists, and policymakers engage with scientific findings. Scientists are not perfectly prescient. It is difficult to forecast when the long-run costs of suppressing lines of work will outweigh the short-run benefits (Graso et al., 2020; Tetlock, 2005). Everyday people, and perhaps even scientists, may also forget that no single set of findings can serve as a definitive indicator of human nature or a final authority on optimal policy. Rather, new findings are pixels of information in an exceedingly complex picture, and censoring one piece because it feels risky may delay or prevent a clearer view.

Transparency

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Author Contributions

Cory J. Clark: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Visualization; Writing – original draft.
Maja Graso: Conceptualization; Methodology; Writing – review & editing.
Ilana Redstone: Conceptualization; Methodology; Writing – review & editing.
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Supplemental Material

Additional supporting information can be found at http://journals.sagepub.com/doi/suppl/10.1177/09567976231168777

Note

1. Because we mentioned the possibility of excluding inattentive participants in secondary analyses in Supplementary Study 1 and in Study 1, we reran our primary analyses with these exclusions to confirm that they did not change our results. Excluding inattentive participants had little influence on any of the harm-hypervigilance effect sizes, and in almost every case, these exclusions increased the size of these effects.

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