**“Anything that looks like smoking is bad”: Moral opposition and support for harm
reduction policy**

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Abstract

One dilemma faced by policy makers is the choice between banning a harmful behavior and allowing the behavior to continue but with mitigated harm. This latter approach—a harm reduction strategy—is often efficacious, yet policies of this sort can be unpopular if people morally oppose the target behavior (MacCoun, 2013). This raises interesting questions for understanding how judgments of harmfulness relate to moral opposition. In four studies ($N = 1,090$), including one U.S. representative sample, we found that increased moral opposition to risky sex, gun ownership, cigarette smoking (Studies 1-3), and unemployment (Study 4), was associated with less support for pre-exposure prophylaxis, gun safety training, e-cigarette use, and federal support respectively. However, there was variation across the issues across time, including when news broke of “vaping sickness” in 2019. Interestingly, judgments of harmfulness of both gun ownership and risky sexual behavior, though correlated with moral opposition, positively predict policy support, suggesting that it is possible to judge a behavior as harmful but otherwise acceptable, and in that case harm-reduction policy is also acceptable. Together, these results highlight the multi-faceted nature of moral opposition and its implications for real-world policy.

Keywords: morality; moral opposition; harm reduction; public policy; harm; compassion

“Anything that looks like smoking is bad”: Moral opposition and support for harm reduction policy

“I’m afraid that we will look back at this moment and see that we had this unbelievable discovery, this technology that had the potential to put the final nail in the coffin in cigarette smoking in this country—and because of this ideology that nicotine itself should be prohibited, that anything that looks like smoking is bad.” – Dr. Michael Siegel as quoted in “The Promise of Vaping and the Rise of Juul” by Jia Tolentino in the New Yorker

Over 480,000 people die per year in the United States due to illness related to cigarette smoking (CDC.gov). Many strategies exist to combat regular cigarette smoking, including patches, gum, support groups, and advertisements—each aimed at helping people quit smoking or preventing others from starting (i.e., to reduce the overall prevalence of cigarette smoking). However, another way to reduce the harm caused by cigarette smoking is to introduce a harm reduction strategy that would allow people to continue smoking in some form, while reducing the physical toll of cigarettes. E-cigarettes (also known as vapes) were designed and marketed to help adults reduce their risk of health problems associated with cigarette smoking (i.e., a harm reduction strategy; Tolentino, May 2018). And, in keeping with previous research on responses to harm reduction strategies—which found that moral outrage leads to opposition to harm reduction policy (MacCoun, 2013)—outrage surrounding vaping arrived shortly after it gained popularity. And then, in April 2019, news broke of hospitalizations and deaths from “vaping sickness.” Now it seemed that vaping was also harmful, and so, not viable as a safer alternative to traditional cigarettes. In a sense, the introduction and revocation of e-cigarettes as a viable harm reduction strategy, serves as something of natural experiment regarding the negative relationship between moral outrage and opposition to harm reduction policy (MacCoun, 2013). We would expect this relationship to exist while e-cigarettes were a viable harm-reduction strategy for smokers, but to disappear once they were also found to be harmful.

The case of moral opposition to cigarettes (and now vaping) suggests that by understanding people's judgments of harm-reduction policy we can deepen our understanding of moral psychology more broadly—including how moral opposition may differ among individuals (see also Ryan, 2014). In addition to providing one answer to the broader call for more research on moral psychology “as lived” (see Schein, 2020), judgments about harm reduction policy allow us to observe moral judgments changing in real time (vs. issues more stolidly in the moral domain like murder or incest). And opposition to harm-reduction policy provides a unique opportunity to better understand what factors lead people to morally oppose or condone a given behavior. The very idea of harm-reduction policy signals that if the behavior were less or not at all harmful, then it would be appropriate to do it. Yet, harm reduction policy is often met with outrage (MacCoun, 2013).

This is because one key factor that predicts whether a particular harm reduction policy will be supported by the public is if the targeted behavior is moralized (MacCoun, 2009; MacCoun 2013). For example, one's moral conviction about a range of social issues (e.g., social security reform) negatively predicts support for compromising solutions and even support for political candidates who are willing to compromise on the issue (Ryan, 2017). These effects suggest a unique role of moralized attitudes in the opposition of both solutions and politicians who endorse nuanced “in-the-gray” solutions over more black-and-white ones like bans. Moreover, people tend to support harm reduction strategies for behaviors that they do not morally oppose, like wearing a helmet when skateboarding (MacCoun, 2013). This pattern of results highlights that people do not oppose harm-reduction *per se* but only oppose it when it allows others to continue in a behavior that they deem morally wrong.

On the one hand, it is intuitive that moral opposition to a behavior would lead people to be opposed to a harm-reduction (vs. prevalence reduction) policy strategy. People do not want other people to have the freedom to behave immorally. And it seems that one (if not *the*) way that people determine whether something is immoral is to determine whether it is harmful (Schein & Gray, 2016, Graham et al., 2011). Harm-reduction policy raises the question: Is a behavior still wrong if it can be rendered meaningfully less or not at all harmful? Imagine two people who morally oppose smoking cigarettes. One finds smoking to be categorically wrong, maybe even disgusting. We might expect this person to find it easy to think of reasons (both moral and not) that smoking is wrong (Rozin, 1999), attribute negative character to people who smoke (e.g., Weiner, 1995; Stuber et al., 2008), and that their judgments of moral wrongness are extreme and categorical (Van Bavel et al., 2012). For this person, a harm-reduction strategy may never be acceptable, or it may be acceptable only to the extent that it fundamentally alters the behavior it targets. Moral opposition to cigarette smoking likely negatively predicts their support for vaping, regardless of how successful vaping might be at reducing the harm associated with smoking (i.e., the behavior may be seen as tainting; see Rottman et al., 2014). They will remain opposed to anything that “looks like smoking” even if it is possible to continue it at reduced risk to the self and others. Now imagine a second individual, who morally opposes smoking solely because it is harmful. For this person, the wrongness of smoking might be ‘dose-sensitive’ (Rottman & Young, 2019) meaning that wrongness judgments increase as the amount of harm associated with the judged behavior increases. If the behavior were not harmful it simply would not be wrong; accordingly, a harm-reduction strategy that made the behavior itself more acceptable, would presumably render the strategy more acceptable too. In this case, their harmfulness judgments of cigarette smoking might positively predict their support for vaping;

when the potential harm associated with cigarette smoking is reduced, both smoking and vaping become more acceptable.

Meta-ethical perspective on moral opposition

To better understand how moral opposition and support for harm-reduction policy relate, we investigated multiple real-world issues opposed by different ideological groups in the United States (so as to not confound moral opposition and ideology). We also sought to measure moral opposition in a way that could capture features of moral opposition irrespective of endorsement of individual moral values (see also Ryan, 2014). In other words, we took a meta-ethical approach to moral opposition. To do this, we put together a list of features that distinguish moral values from preferences (i.e., indicators of moralization; Rozin, 1999) irrespective of *what* is being morally opposed. For example, once a behavior is in the moral domain, research suggests that people tend to be more intolerant to dissent, more confident in their own beliefs (Bennett, 2002; Fernbach et al., 2019; see Bauman & Skitka, 2009 for review), and more fluent at generating reasons, both moral and not, that the immoral behavior should cease (Rozin, 1999). Moral opposition pushes issues and preferences into extremes, such that people tend to use the anchors of the scale when thinking in moral terms (Van Bavel et al., 2012). That is, one indication that a person morally opposes a behavior is that reasoning about it is no longer nuanced; preferences, norms, and behaviors become more insensitive to evidence (Scott et al., 2016; but see Gray & Schein, 2016). Altogether, the pattern of thinking that we employ when we morally oppose behaviors is one that differs systematically from how we reason about and treat other behaviors (Goodwin & Darley, 2008).

The evocation of moral emotions is another indicator of moral opposition, and possibly a cause of it (Feinberg et al., 2019; Skitka et al., 2018). Moral opposition likely involves the

energization of moral emotions like anger, disgust, and outrage, which can instantiate and intensify moral convictions (Feinberg et al., 2019; Brandt et al., 2015; Skitka & Wisneski, 2011). And indeed, previous research suggests that moral emotions, particularly those linked to moral outrage (Tetlock, 2003), are associated with less support for harm reduction policies (MacCoun, 2013) and resistance to compromise more generally (Ryan, 2017).

Present Research

In the present research, we sought to deepen our understanding of the relationship between moral opposition and support for harm-reduction policy. To do this, we took a meta-ethical lens to moral opposition, building a novel scale of moral opposition, using features of moral judgments based on decades of research. This allowed us to compare moral opposition across multiple behaviors that are likely opposed for different reasons (i.e., they might violate different moral values or foundations; Graham et al., 2011) and by people with different social identities and ideologies (Graham et al., 2009). This also allowed us to validate our scale by conceptually replicating the finding that moral opposition to a given behavior negatively predicts support for harm-reduction policy aimed at that behavior (MacCoun, 2013). We next sought to test how judgments of harmfulness relate to support for harm-reduction policy. Even though we expected judgments of harmfulness to be positively related to the meta-ethical measure of moral opposition, it is possible that for some, those whose judgments of moral wrongness are predominantly based in their judgments of harmfulness, it is possible to predict a positive relationship between moral opposition and support for harm-reduction policy. Finally, over the course of data collection, we fortuitously collected data about vaping before and after news of vaping sickness broke in April 2019. This created an opportunity for us to obtain some discriminant validity. We would only expect a negative relationship between moral opposition

and support for harm-reduction policy, if the policy itself can actually reduce the harm associated with the behavior.

Overview of Studies

Across four studies, collected between March 2019 and March 2022, we tested whether moral opposition to a given behavior was associated with less support for harm reduction policy targeting that behavior and how this relationship relates to judgments of harmfulness. We selected three to four behaviors that at least some people morally opposed at the time of data collection (cigarette smoking, gun ownership, risky sexual behavior in Studies 1-3; unemployment in Study 4) and one potential harm-reduction policy for each (vaping, gun safety training, PrEP, government benefits; respectively). We created a novel measure of moral opposition to capture multiple, empirically supported meta-ethical aspects of morality (Nucci & Turiel, 1978; Rozin, 1999; Skitka & Mullen, 2002; Skitka et al., 2005; Skitka, 2010; Smetana, 1985, Tetlock et al., 2000; Turiel, 1983) that reflect moral opposition irrespective of individual moral values. We also measured judgments of harmfulness of the behaviors (adapted from Schein et al., 2016). We tested the link between moral opposition and support for harm reduction policy (Study 1 and Study 2), and how judgments of harmfulness influence that relationship (Study 3 and Study 4) across four different policy domains in four similar studies.

In Study 1 we only tested judgments of one behavior (owning a gun). In Studies 2 and 3, we test three behaviors that at least some people morally oppose (owning a gun, engaging in risky sex, and smoking cigarettes) and are familiar to most people in the United States. Finally, in Study 4 (conducted March 2022), we removed cigarette smoking, as we knew vaping was no longer a viable harm reduction strategy, and we replaced it with remaining unemployed. Between Study 2 and Study 3 in April 2019, a news cycle broke about vaping sickness at which

point the negative relationship between moral opposition and policy support is no longer observed. Indeed, in addition to the small reliable negative relationship between moral opposition and support for harm reduction policy across issues, which an internal meta-analysis at the end of the paper provides support for, we also see notable variation across issues and over time. We cannot account for all of this variation, but we were able to understand variation in the relationship between moral opposition to cigarette smoking and use of e-cigarettes over the course of data collection. We hope this case study is both illuminating in itself and demonstrates the kinds of factors that could explain the variation that we see across issues and studies.

All pre-registrations, materials, data, and analysis code are available on the Open Science Framework¹. Sample size was always determined in advance, and we report all manipulations, measures, and exclusions in these studies. We also preregistered secondary analyses to see whether political ideology was a significant moderator of the relationship between moral opposition and policy support. These results are inconsistent, and fully reported in the supplemental materials. All results included all participants' data who consented and provided data for at least one of the individual issues (i.e., even if they did not complete all three issues). As preregistered, target analyses were re-run excluding participants who failed the attention checks, and since the obtained results yielded similar conclusions, we report on the most inclusive dataset. With the exception of Study 1 wherein only one issue was tested, all studies follow the same analysis pattern—reporting first preregistered mixed effects models that specify random intercepts for participants and stimuli (issue type). These analyses use the 'lme4' package (Bates et al., 2015) and the 'lmerTest' package (Kuznetsova et al., 2017) to compute model *p*-values using R statistical analysis software (R Core Team, 2019). Each survey was

¹ https://osf.io/3ztyb/?view_only=8d14710485e9444d9d3b9368eba19073

distributed via Qualtrics survey software (Qualtrics, Provo, UT). We report all preregistered measures (e.g., item wordings) and ancillary analyses, including an in-depth factor analyses for the moral opposition scale in the Supplemental Materials. Data collection procedures for all studies were approved by the local IRB.

Study 1

We investigated the relationship between moral opposition to gun ownership and support for gun safety training, a policy that potentially reduces that harm associated with owning a gun without banning ownership. This approach conceptually replicates the findings that moral outrage predicts support for prevalence reduction over harm reduction (MacCoun, 2013) and so also further validates our moral opposition scale. We hypothesized that the more an individual morally opposes gun ownership, the less they would support a policy that aims to reduce harm associated with owning a gun (i.e., gun safety training).

Method

Design

Study 1 investigated gun ownership, presenting the information on the issue and the purported harm reduction policy (here, mandatory gun safety training) as a government memo.

Participants

We recruited a convenience sample of a total of 172 participants using the subject pool at a public university for course credit (59 males, 108 females, 5 did not report, $M_{age} = 20.20$, $SD_{age} = 9.30$). After reaching the 120-participant recruitment goal, data were collected until the end of the semester without viewing the data. A sensitivity power analysis using G*Power3.1 (Faul et al., 2007) indicated that this sample afforded us 80% power to detect an effect as small as $\rho = 0.19$.

Materials

Harm reduction policy support scale

We created items to capture support for the proposed harm reduction policy of proper gun use training. Representative items included: “proper gun use training is a good idea,” “I would support a politician who promoted proper gun use training to reduce the harm caused by gun violence,” and “I am in favor of proper gun use training to reduce the harm caused by gun violence”, which were all rated on a scale from 1 = *strongly disagree* to 7 = *strongly agree* (adapted from MacCoun & Paletz, 2009; MacCoun, 2009; Skitka & Bauman, 2008; Cronbach’s $\alpha_{gun} = 0.94$; see the Supplemental Materials for more on scale validation).

Moral opposition scale

To assess the degree of moral opposition to a particular behavior, we brought together decades of research on morality to create a moral opposition scale, which contained both distinctly cognitive and affective aspects of the moralization process. This included face-valid items such as “it is morally wrong to [own a gun],” and defining aspects of morality such as authority-independence—“even if the government says it’s ok, owning guns is still wrong”—all rated from 1 = *strongly disagree* to 7 = *strongly agree* (Nucci & Turiel, 1978; Skitka & Mullen, 2002; Skitka et al., 2005; Skitka et al., 2009; Smetana, 1985; Tetlock et al., 2000). The full moral opposition scale had Cronbach’s $\alpha = 0.81$, however, for analyses, a total of 9 items were utilized (Cronbach’s $\alpha_{gun} = 0.92$; see Study 1 Results & Discussion and Supplementary Materials for more detail). These items were selected to best capture the theme of interest and were most face-valid: Five negative moral emotion items were included which measured how offensive, disgusting, anger-eliciting, moral outrage-eliciting, and upsetting it is to own a gun; adapted from Tetlock and colleagues (2000), and four moral cognition items, measuring moral clarity (“it’s

morally wrong to own guns”), black and white nature of the issue (“it’s not complicated, it’s just wrong to own guns”), authority independence (“even if the government says it’s ok, owning guns is still wrong”), and issue fluency (“it is easy for me to think of reasons why it is wrong to own a gun”); adapted from Skitka et al. (2009), Nucci and Turiel (1978) Smetana (1985), and Rozin (1999), respectively. However, as noted above, we report the 9-item scale here because the full scale and the sub-components yielded consistent patterns of results.

Demographics

We asked participants to indicate their gender, age, and political orientation. We measured political orientation using three 7-point items: “In terms of *economic issues* in particular, how liberal or conservative are you?”; “In terms of *social and cultural issues* in particular, how liberal or conservative are you?”; and “*Overall*, on the following scale of political orientation (from extremely liberal to extremely conservative) where would you place yourself?” (1 = *extremely liberal* to 7 = *extremely conservative*). The correlation between the three items were moderate to large ($r_s > .51$) and had a Cronbach’s alpha of .80. We combined the three items into a single, political ideology index.

Procedure

Consenting participants were told to imagine themselves as policy makers in the United States and evaluate problems in society. Participants then read about the policy issue (i.e., gun ownership) and a proposed harm-reduction policy (i.e., proper gun use training) (see Figure 1) with only accurate information (no deception) included. Next, they answered questions regarding how they feel about the harm-reduction policy as a solution. Participants then answered questions about how much they morally oppose gun ownership (question order randomized). Finally, participants answered demographic questions and were debriefed.

Fig. 1. The policy issue and description of the proposed harm reduction policy that participants saw prior to answering questions about policy support or issue moralization.

Results & Discussion

We first investigated the target relationship between the moral opposition to gun ownership and support for gun safety training policy. As predicted, moral opposition negatively predicts support for the harm reduction strategy, $b_{\text{opposition}} = -0.30$, $SE = 0.07$, $t(169) = -4.24$, $p < .001$, $r = 0.31$, 95% $CI [-0.437, -0.160]$ suggesting that as moral opposition increases, support for the proposed harm-reducing policy decreases (see Figure 2). The pattern of results is robust to relevant covariates of gender, age, and political ideology, $b_{\text{opposition}} = -0.29$, $SE = 0.08$, $t(163) = -3.90$, $p < .001$, $r = 0.29$, 95% $CI [-0.441, -0.144]$. Moreover, given the political slant of the gun ownership issue (i.e., in the U.S., conservatives tend to approve of gun ownership while liberals disapprove), we also tested whether political ideology was a moderator of the relationship between moral opposition to gun ownership and harm-reducing policy support, finding no evidence of a significant interaction, $b = 0.06$, $SE = 0.06$, $t(162) = 1.02$, $p = .307$, $r = 0.08$, 95% $CI [-0.056, 0.176]$. As predicted, we found that as moral opposition to gun ownership increased, support for the proposed harm-reducing policy (gun safety training program) decreased (see

Figure 2). Critically, this relationship remained robust when we re-run analyses with conservative individuals only (pro-gun), $b = -0.24$, $SE = 0.10$, $t(95) = -2.37$, $p = .020$, $r = -0.24$, 95% $CI [-0.436, -0.038]$, and interestingly, here, with the subset of only the liberal individuals, $b = -0.39$, $SE = 0.12$, $t(65) = -3.31$, $p = .002$, $r = -0.38$, 95% $CI [-0.6182896 -0.15311174]$.

Table 1. Correlation matrix for moralization, subscales, & policy support

Measure	1	2	3	4	N
<u>Gun Ownership</u>					
1. Policy support Index	--				172
2. Moralized Opposition Index	-.31***	--			172
3. Moral emotions Index	-.27***	.96***	--		172
4. Moral cognitions Index	-.33***	.94***	.80***	--	172

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Fig. 2. Scatter plot and fitted regression line depicting increases in moral opposition to gun ownership are negatively associated with support for gun safety training. The predictor and outcome variables are scaled for clarity of presentation. Shading represents 95% Confidence Intervals.

Here, we also compiled scholarship on morality to create a moral opposition scale including items from research on moral conviction and moral attitudes (Skitka & Mullen, 2002; Skitka et al., 2005), sacred values (Tetlock et al., 2000), moralization (Rozin, 1999), moral

objectivity (Goodwin & Darley, 2008; Turiel, 1983) and moral emotions (Tetlock et al., 2000). To best use this new scale, we selected items for parsimony and thematic coherence in Study 1 (though, using all items for moral opposition instead of the index reveals the same significant pattern of results). We found that, as previous research has found, our scale negatively predicted harm reduction policy support (MacCoun, 2013). We then used the same items to measure moral opposition and policy support for all of the subsequent studies². We chose to include the full set of items for Studies 1 and 2 (even though analyses used the same subset for both of those studies) in order to conduct an exploratory factor analysis (Study 2 Supplementary Materials). We also conducted a confirmatory factor analysis (Study 2b Supplementary Materials) to make sure our items capture the underlying latent structure; we had relatively good fit for the selected items as evidenced in the exploratory and confirmatory factor analysis across each of the three issues. Studies 3 and 4 did not include additional items besides the items used for the indices established in Studies 1 and 2.

Study 2

In Study 2, we explored whether the inverse relationship between moral opposition and support for harm reduction policy would generalize to two additional issues. We predicted that as moral opposition of gun ownership (replication), cigarette smoking, and risky sex increased, support for gun use training programs, e-cigarette use (i.e., vaping), and PrEP, respectively, would decrease. We also tested but did not find that manipulating the framing of the judgments as either moral or practical exacerbated or mitigated this relationship, and so we report it only very briefly here.

Methods

² With one exception to the policy support index in Study 3. Study 3 did not include “is a smart solution” as is included in Study 1, Study 2, and Study 4, but instead included the reverse coded item “is a bad solution”.

Design

A mixed, 2 framing (between-subjects manipulation: moral lens vs. practical lens) by 3 issue type (within-subjects: gun ownership, cigarette smoking, and risky sex) factorial design was utilized. Participants were randomly assigned to one of two conditions: they were told to evaluate a harm-reducing policy solution through a *moral* lens or *practical* lens prior to being presented with any of the issues. Participants then made judgments about each of the three different policy issues (gun ownership, cigarette smoking, and risky sexual behavior) and their proposed harm-reducing solutions (gun use training, vaping, and PrEP use)—presented as government memos and shown in a randomized order.

Participants

We collected data from 241 consenting participants on Amazon's Mechanical Turk (MTurk). The only inclusion criterion was current United States residence to ensure they were aware of the specific issues. Of these 241 participants, 13 failed to complete any of the dependent variable measures and 49 failed to complete the entire survey. We conducted our analyses on a final sample of 195 participants ($M_{\text{age}} = 39.49$, $SD_{\text{age}} = 9.98$, Male = 88, Female = 92) who answered questions about at least one of three presented issues (184 completed all three issues). As preregistered, for those who answered dependent variable questions from at least one of the three policy issues, all of their responses were included in analyses, even if they exited prior to completing all of the questions (179 completed the entire survey). A sensitivity power analysis using G*Power3.1 (Faul et al., 2007) indicated that this sample afforded us 80% power to detect an effect as small as $\rho = 0.18$. All respondents were paid an average of \$1.48 for their participation and were debriefed.

Materials

Moral Framing Manipulation

At the beginning of the study, participants were first asked to imagine themselves as policy makers in the United States and consider and evaluate a solution to problems in society. They were then randomly assigned to a moral or practical framing condition asking them to make their judgments through a moral or practical lens. This manipulation did not significantly affect our pre-registered manipulation check (a moral outrage scale; Tetlock et al., 2000) and is not discussed further (for more, see Supplemental Materials).

Policy issues

Next, participants were shown three policy issues (presented in randomized order), followed by a series of questions measuring their judgments of each issue. The issues were presented as images of what resembled U.S. government memos (see Figure 1), with each memo discussing an issue and a potential solution to combat its adverse consequences (i.e., harm). The issues were presented in the same way regardless of framing condition.

Harm reduction policy support scale

Mirroring the materials of Study 1, we measured policy issue support for each harm reduction policy, with representative items including “[proper gun use training/vaping/PrEP] is a good idea” rated from 1 = *strongly agree* to 7 = *strongly disagree*. The policy support scales for each of the three issues also had high internal reliability (Cronbach’s $\alpha_{gun} = 0.97$, $\alpha_{cigarette} = 0.97$, and $\alpha_{sex} = 0.97$).

Moral opposition scale

We used the same moral opposition scale from Study 1 (described in the overview), where 9 items were rated from 1 = *strongly agree* to 7 = *strongly disagree*³, but extended to the

³ The scale anchors were flipped for Study 2 during the experimental procedure, but then subsequently reversed for readability and consistency of reporting analyses.

three issues (gun ownership, tobacco use, and risky sex; Cronbach's $\alpha_{gun} = 0.97$, $\alpha_{cigarette} = 0.94$, and $\alpha_{sex} = 0.95$). We also included more items to refine our scale than were included in the index for analyses (see Supplemental Materials for more detail).

Demographics

The demographics were the same as in Study 1, including the political ideology index (Cronbach's $\alpha = 0.95$).

Procedure

The procedure matched that of Study 1 with two exceptions: Consenting participants were randomly assigned to take a moral or a practical lens to problem solving, and the three issues were presented in random order. After the manipulation, participants read about three policy issues (gun ownership, cigarette smoking, and risky sex) and their respective harm-reducing solutions following the same format as used in the Study 1.

Results

As preregistered, target analyses were re-run excluding participants who failed the attention checks, and since the obtained results yielded similar conclusions, we report on the most inclusive dataset. We report the mixed-effects model followed by linear regressions for each issue separately.

Moral opposition and policy support

We ran mixed-effects models where policy issue (gun ownership, cigarette smoking, risky sex) and participant were entered as random effects (Wolsiefer et al., 2017; Yarkoni, 2019). We did not include covariates in the mixed-effects models given that participants were handled as random effects (Baayen et al., 2008). Critically, we found support for our hypothesis that increases in moral opposition predicted decreases in support for harm reduction policy, $b =$

-0.24 , $SE = 0.04$, $t(553) = -5.83$, $p < .001$, $r = 0.24$, 95% $CI [-0.326, -0.162]$ (see Figure 3a).

When we included issue type as a fixed factor (and the interaction term⁴) alongside covariates (age, gender, and political ideology), a marginally significant marginal effect of moral opposition emerged: $b = -0.13$, $SE = 0.07$, $t(475) = -1.86$, $p = .063$, $r = 0.09$, 95% $CI [-0.265, -0.006]$.

These results provide strong evidence of the hypothesized effect: as moral opposition of a behavior increases, support for a harm reduction policy aimed at the behavior decreases.

Fig. 3a. Moral opposition negatively predicts policy support. Shading represents the Standard Error of the Mean. Note: This graph contains scaled predictor and outcome variables; Issue type was entered as a fixed effect for graphing, but subjects were entered as random.

⁴ There was no statistically significant interaction effect, $F(2, 442) = 2.67$, $p = .070$.

Fig. 3b. Study 2 individual violin plots showing probability density of the Policy Support Index and Moralization Index by issue type: gun ownership, cigarette smoking, and risky sex.

Individual Policy Issues

Linear regressions revealed that moral opposition was a significant predictor of harm reduction policy for each individual issue: increases in moral opposition to gun ownership predicted decreased support for gun safety training, $b_{\text{opposition}} = -0.15$, $SE = 0.07$, $t(169) = -2.20$, $p = .029$, $r = 0.17$, 95% $CI [-0.288, -0.013]$ when including age, gender, and political orientation as covariates though not individually.⁵ Following this pattern, increases in moral opposition to cigarette smoking negatively predict support for vaping, $b_{\text{opposition}} = -0.28$, $SE = 0.08$, $t(167) = -3.44$, $p < .001$, $r = 0.26$, 95% $CI [-0.438, -0.119]$, and increased moral opposition to risky sexual behavior negatively predicted support for use of PrEP, $b_{\text{opposition}} = -0.27$, $SE = 0.08$, $t(169) = -3.46$, $p < .001$, $r = 0.26$, 95% $CI [-0.422, -0.116]$ when adjusting for age, gender, and political

⁵ Moral opposition did not significantly predict negative support when excluding covariates, $b = -0.06$, $SE = 0.07$, $t(188) = -0.95$, $p = .345$, $r = -0.07$, 95% $CI [-0.196, 0.069]$.

ideology (see Figure 3a). Correlations among the variables for each issue are included in Supplemental Materials.

Figure 4. Scatter plots and fitted regression lines illustrating the relationship between moral opposition (gun ownership, cigarette smoking, and risky sex) and support for harm reduction policy. Shading represents the 95% Confidence Intervals. The predictor and outcome variables are scaled for clarity of presentation, and covariates are not included.

Discussion

In Study 2, we found the predicted inverse relationship between moral opposition to a behavior and harm reduction policy support aimed at that behavior across three current policy issues. The more that an individual morally opposes a given behavior, specifically gun ownership, cigarette smoking, and risky sexual behavior, the less they support policies aimed at reducing the harm associated with those behaviors. We intentionally selected issues that do not cohere to a single ideological perspective and found that results are robust when including political ideology as a covariate. Taken together, we have found evidence, in line with previous research (MacCoun 2009; 2013) that moral opposition to a behavior predicts a lack of support for policies that would allow people to continue the behavior at a reduced risk of harm.

On the one hand, these findings are intuitive—people do not want other people to do things that they judge to be morally wrong—even at reduced risk of harm. Yet, one way that people determine whether something is immoral is whether or not it is harmful (Graham et al., 2011; Haidt et al., 1993; Schein & Gray, 2016; 2018). This raises the interesting possibility that while moral opposition appears to negatively predict support for harm reduction policy, judgments of harmfulness might positively predict support for harm reduction policy. Accordingly, in Studies 3 and 4 we aimed to both replicate the target relationship between moral opposition and harm reduction policy support (without the manipulation), and to investigate the role that judgments of harmfulness play in predicting policy support.

Study 3

The purpose of Study 3 was to examine how moral opposition and judgments of harmfulness relate to support for harm reduction policies, and to replicate the target negative relationship between moral opposition and policy support, with a sample representative of the U.S. population in terms of age, sex, and ethnicity. This study also excluded the framing manipulation to ensure that the pattern reemerged across the three issues even without that portion of the procedure. We again predicted an inverse relationship between moral opposition and policy support across each individual issue.

Study 3 was also a pre-registered direct replication of a study conducted in October 2019 which is reported in full in the Supplement (Study 2b). Two of the proposed policies included in that study were, in hindsight, not harm reduction policies (but instead, a tax, and government funding to a nonprofit). In that study, we also found two surprising effects. First, we found an unexpected suppression effect: though moral opposition to a behavior and judgments of how harmful it is are strongly positively correlated, moral opposition negatively predicts support for

harm reduction policy, while harmfulness judgments positively predict support for that same policy. We used mediation analyses in that study, not for causal inference, but to better understand the suppression effect. We pre-registered a replication of that suppression effect for Study 3. Second, we did not observe a relationship between moral opposition to cigarette smoking and support for vaping in Study 2b (in the Supplement). Data collection for Study 2b took place in October 2019, during an ongoing public discussion and media coverage over the harmfulness of e-cigarettes (see Howard, 2019), which culminated in passing relevant legislation in December of 2019 (Kaplan, 2019).

Given these interesting but unexpected findings and a fortuitous opportunity to study a public policy issue in flux in real time, Study 3 is therefore a pre-registered direct replication of this supplemental study (Study 2b). We aimed to replicate the negative relationship between moral opposition and harm reduction policy and the suppression effect across each of the three issues without the problematic additional issues in Study 2b.

Methods

Design

We used the same design as Study 2, investigating gun ownership, cigarette use, and risky sex, but excluding the between-subjects manipulation.

Participants

Data were collected from 345 participants recruited using Prolific. Participants were representative of the U.S. population in terms of age, gender, and ethnicity. The final sample included 335 participants ($M_{age} = 44.35$; $SD_{age} = 15.64$; 67% White; 14% Black; 9% Asian; 6% Latin/Hispanic; 3% Other; 50% Female; 48% Male; 2% Other) who both completed the questions for at least one full issue (smoking, risky sex, gun ownership) and correctly responded

to the attention check item (as preregistered)⁶. A sensitivity power analysis using G*Power3.1 (Faul et al., 2007) indicated that this sample afforded us 80% power to detect an effect as small as $\rho = 0.13$. All respondents were paid an average of \$1.90 for their participation and were debriefed.

Materials

Harm reduction policy support scale

We preregistered the items from policy support scale used in Study 1 rated from 1 = *strongly disagree* to 7 = *strongly agree*. The three issues had Cronbach's alphas of 0.97.

Moral opposition scale

The preregistered moral opposition scale matched that of previous studies and had high reliability. Cronbach's $\alpha_{gun} = 0.97$, $\alpha_{cigarette} = 0.94$, and $\alpha_{risky\ sex} = 0.96$.

Judgments of harmfulness scale

To measure judgments of harmfulness, we included four items, asking how *threatening*, *harmful*, *dangerous*, and how *much suffering* is caused by gun ownership/cigarette smoking/risky sex (Schein et al., 2016). These items were rated on a scale from 1 = *Not at all [harmful]* to 7 = *Extremely [harmful]*. The Cronbach's alphas were 0.96, 0.88, and 0.93 for the three issues (gun ownership, cigarette smoking, and risky sex), respectively (see Table 2).

Table 2. Correlation matrix for moral opposition, harmfulness & policy support

Measure	1	2	3	N
1. Policy support Index	--			335
2. Moral Opposition Index	-.31***	--		335
3. Harmfulness Index	-.31***	.67***	--	335

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

⁶ Here, we deviated slightly from the pre-registration by including only one attention check (instead of two) to preserve the sample size. Conclusions from analyses remain the same if participants who failed attention checks remain in the dataset.

Demographics

Participants were asked to indicate their preferred gender, age, and political ideology index ($\alpha = 0.96$) as in Studies 1 and 2.

Procedure

The procedure was identical to Study 2, but with no between-subjects random assignment.

Results

Overall, we successfully replicated both relevant findings from the supplemental study in a sample representative of the U.S. population on age, gender, and ethnicity. First, we found the pre-registered negative relationship between moral opposition and support for harm reduction policy. We also replicated the suppression effect found in a previous study (see Supplemental Materials Study 2b). We use the mediation analyses not to infer causality in any direction, but to see, consistent with suppression, whether inclusion of harmfulness judgments *increases* the size of the direct effect between moral opposition and policy support. The mediation analyses we present represent just one of several possible models. We present this one because we pre-registered it, and because we think it is the most theoretically interpretable: Harmfulness judgments account for separate variance in policy support in the opposite direction of moral opposition.

As we discuss, judgments of harmfulness change for vaping, and the relationship between moral opposition to cigarette smoking and support for vaping change interestingly over the course of data collection for this project. We conducted an exploratory longitudinal analysis to better understand these results.

Moral opposition and policy support

We used the same analysis plan as in Study 2. The target relationship between moral opposition and harm-reducing policy support was again significant: increases in moral opposition predicted decreases in support for harm reduction policy support, $b_{opposition} = -0.25$, $SE = 0.03$, $t(990) = -8.54$, $p < .001$, $r = 0.26$, 95% $CI [-0.31, -0.20]$ (see Figure 6a-b). This pattern remained when harmfulness judgments were included as a covariate ($b = -0.25$, $SE = 0.04$, $t(963) = -6.59$, $p < .001$, $r = 0.21$, 95% $CI [-0.33, -0.18]$) and when including issue type as a fixed effect alongside covariates (age, gender, and political ideology) rather than as a random effect (including the interaction term⁷), $b = -0.22$, $SE = 0.05$, $t(959) = -4.35$, $p < .001$, $r = 0.14$, 95% $CI [-0.32, -0.12]$.

Fig. 5a. Moral Opposition and harmfulness judgments predict opposite directions of policy support for the gun ownership and risky sex issues. No significant relationships for the cigarette smoking issue. Shading represents the standard error of the mean. *Note:* Both graphs contain scaled predictor and outcome variables; Issue type was entered as a fixed effect for graphing purposes and predictors were modeled together (not separately), but subjects were entered as random.

⁷ There was no statistically significant interaction effect, $F(2, 894) = 1.53$, $p = .217$.

Fig. 5b. Individual violin plots showing probability density of Policy Support, Moral Opposition, and Harmfulness Judgments by issue type: gun ownership, cigarette smoking, and risky sex.

Harmfulness judgments, moral opposition, and policy support

We preregistered that harmfulness judgments suppress the effect of moral opposition on policy support. Contrary to our prediction, there was a significant negative relationship between the harmfulness index alone and policy support, $b_{\text{harmfulness}} = -0.17$, $SE = 0.03$, $t(999) = -5.35$, $p < .001$, $r = 0.17$, 95% $CI [-0.238, -0.110]$ such that more harmfulness judgments also led to less support for harm-reducing policy (see Figure 6a). However, the association did not retain significance in the preregistered model that includes harmfulness judgments and moral opposition in the model simultaneously ($b_{\text{harmfulness}} = 0.005$, $SE = 0.04$, $t(976) = 0.13$, $p = .899$, $r = 0.004$, 95% $CI [-0.078, 0.086]$), even with a product-moment correlation of $r(1003) = .67$, $p < 0.001$. Critically, the variance inflation factor (VIF) for the model with both moral opposition and harmfulness judgments included remained below 2, suggesting that they were not too severely multicollinear to be included simultaneously. This is again suggestive of a suppression effect, such that moral opposition and harmfulness judgments each explain some unique variance in policy support, but in opposite directions.

We preregistered testing whether harmfulness judgments statistically mediated or suppressed the relationship between issue moralization and policy support⁸. As predicted, risky sexual behavior and gun ownership both evidenced the suppression effect; that is, the relationship between moral opposition and policy support *increased* in magnitude when including harmfulness judgments simultaneously, changing from $b = -0.17$ to -0.24 (bootstrapped estimates: $b = -0.24$, 95% $CI [-0.40, -0.10]$, $p < 0.001$) and from $b = -0.36$ to -0.47 (bootstrapped estimates: $b = -0.47$, 95% $CI [-0.59, -0.37]$, $p < 0.001$), respectively (indirect effect_{gun}: 0.069, $CI [-0.013, 0.16]$, $p = 0.104$; indirect effect_{risky sex}: $b = 0.11$, 95% $CI [0.049, 0.18]$, $p < 0.001$). This suggests a suppression effect (Tzelgov & Henik, 1991; MacKinnon et al., 2000).

However, cigarette smoking and vaping showed a different pattern: The relationship between moral opposition to cigarette smoking and support for policy related to vaping was significantly statistically mediated by judgments of the harmfulness of cigarette smoking, with a significant indirect effect, $b = -0.07$, 95% $CI [-0.13, -0.01]$, $p = 0.008$, and no significant average direct effect, $b = -0.0953$, 95% $CI [-0.25, 0.06]$, $p = 0.22$, after bootstrap estimation with 500 samples (Shrout & Bolger, 2002). Here, we see that harmfulness judgments and moral opposition share variance when explaining policy support. All variables are correlational, and we present just one possible configuration of the mediation model here. We do not think it is justified to interpret the model in causal terms, and we will further discuss the issue of vaping in the longitudinal analyses below.

Longitudinal Analysis

⁸ Harmfulness judgments and moralization are highly correlated for each issue [gun ownership: $r(333) = 0.77$, $p < 0.001$; cigarette smoking: $r(333) = 0.45$, $p < 0.001$; risky sex: $r(333) = 0.66$, $p < 0.001$]. For full breakdown of the relationship between predictor variables see Supplemental Materials for Study 3.

As noted, over the course of data collection, there was an ongoing public discussion and media coverage over the harmfulness of e-cigarettes (see Howard, 2019), which culminated in passing relevant legislation in December of 2019 (Kaplan, 2019). Data collection for the supplemental study (Study 2b) took place in October 2019, during the news cycle that precipitated the changes to e-cigarette commerce. Data collection for Study 3 took place in August 2020, after the beginning of the COVID-19 pandemic. Notably, average vaping policy support significantly declined by about a full point between April 2019 and October 2019 ($M_{diff} = -0.97$; $95\%CI_{diff} = [-1.32, -0.61]$), and by about a point and a half between April 2019 and August 2020 ($M_{diff} = 1.49$, $95\%CI_{diff} = [-1.86, -1.12]$) following the vaping illness-related news cycle. This provides something of a natural experiment for understanding the relationship between moral opposition and harm-reduction policy, providing some discriminant validity. In real time, we learned that a once potentially novel, desirable, and viable strategy to reduce the harm associated with cigarette smoking (Tolentino, 2018) was now potentially harmful in and of itself (and thereby much more like the behavior it targets). During the news cycle around vaping sickness, the correlation between moral opposition to cigarette smoking and vaping policy support was very near zero, while it stayed negative for all other issues tested at all time points (see Figure 6). There is a negative relationship between harmfulness judgments and policy support for cigarettes only (see Figure 5a). Even though the negative relationship between moral opposition to cigarettes and support for vaping becomes observable again after the news cycle regarding vaping sickness ended. This suggests that it is not only the harmfulness of vaping, but the salience of it, that affects support.

Fig. 6. Change in correlation between policy support and moral opposition over time for each of the three issues presented in Study 2 – 3. The gray dashed line represents approximately when the cycle of media coverage for vape-related lung illness began, the green dashed line indicates approximately when legislation was passed. The black dotted line represents no correlation ($r = 0$).

There is also some variation across studies within both gun ownership and risky sexual behavior as well. The issue of vaping sickness was highly salient in October 2019 and provided a testable explanation for some of this variation for cigarette smoking. It can also serve as an example for the kinds of factors that would explain variation in the negative relationship between moral opposition and support for harm-reduction policy over time and across issues. For example, people may differ in terms of how effective they think a given harm-reduction strategy is, how risky the behavior is (Royzman et al., 2017), and how it compares to other possible policies targeting the behavior—and all of these might also change over time and be sensitive to current events, and other determinants of salience in people’s minds.

Individual policy analyses

We report the results for each individual policy for Study 3 in the supplement for brevity. For transparency, Figure 7 shows results of moral opposition and judgments of harmfulness predicting support for harm reduction policy, for each individual issue with the statistics overlayed in the plots. Overall, there is a consistent small relationship between moral opposition and support for harm reduction policy (when the predictor is entered alone and when we control for judgments of harmfulness). There is also variation across the individual issues and over time.

Fig. 7. Top Panel: Relationship between moral opposition and policy support for each issue: gun ownership, risky sex, and cigarette smoking. Bottom Panel: Scatter plots and fitted regression lines for harmfulness judgments of each issue (gun ownership, risky sex, and cigarette smoking) and support for harm reduction techniques. The predictor and outcome variables are scaled for clarity of presentation. Covariates not included. When covariates are included, the relationship between harmfulness and policy support is no longer significant for gun ownership and risky sex but remains significant for cigarette use (see Supplemental Materials). Shading represents the 95% Confidence Intervals.

Discussion

Study 3 replicated the predicted overall pattern (in a representative U.S. sample) suggesting that greater moral opposition to a given behavior was associated with less support for harm-reducing policy aimed at that behavior. Moreover, we found evidence of a suppressor effect: Harmfulness and moral opposition explain separate variance in policy support in opposite directions. We used our pre-registered mediation analyses in Study 3 to find evidence for suppression: the size of the direct effect of moral opposition on policy support increases when we include harmfulness judgments and has a sign that differs from the indirect effect (MacKinnon et al., 2000). This allowed us to explore how moral opposition and harmfulness judgments could be both highly positively correlated, and predict policy support in opposite directions, but not to establish a causal pathway.

Altogether, the confirmed suppression effect raises the possibility that there are multiple kinds of moral opposition: for some the behavior is wrong primarily because it's harmful. If it is possible to make the behavior less harmful, then it is also possible to make it permissible, and with it, the harm-reduction policy that targets it. For others, the behavior is wrong even if it can be rendered meaningfully less harmful, and so a harm-reduction policy still allows people to continue in a behavior that they deem morally wrong. In the case of PrEP, people who oppose risky sexual behavior only because it is harmful, may be more likely to support PrEP use. For those who morally oppose risky sexual behavior even if it could be rendered less harmful, they are less likely to support PrEP use. In the case of gun ownership, people who are morally opposed to gun ownership are less likely support mandatory gun safety training, but for those who find gun ownership harmful (but otherwise acceptable), mandatory safety training may be a viable policy. We explicitly test this possible interpretation of the suppression effect in Study 4.

Study 4

In Study 4, we aimed to expand our understanding of how morality relates to support for opposition to harm-reduction policy. In particular, for some, it may be not just that they do not morally oppose the behavior, but that they morally endorse the behavior or find it morally acceptable—that is, not merely tolerable, but morally appropriate, or well within one’s rights, which should be protected. Accordingly, in Study 4, we measured not just moral opposition, but moral acceptance to broaden our understanding and acknowledge those whose attitudes may be moralized but not opposition. In addition, we were also able to directly investigate our interpretation of the suppression effect from Study 3, and measured compassion for those who engage in the target behaviors as another predictor of support for harm-reduction policy.

We used three issues: gun ownership, risky sex, and unemployment. We excluded cigarette smoking (and its solution, vaping) because of changes in the discourse surrounding vaping that took place over the course of data collection (see Study 3 Longitudinal Analysis). For the issue of unemployment, the corresponding harm reduction policy included was federal welfare benefits. We again predicted an inverse relationship between moral opposition and policy support across each individual issue.

Methods

Design

Study 4 used the same design as Study 3, investigating gun ownership, risky sex, and the new issue, increased unemployment during the COVID-19 lockdown, and its harm reduction policy, federal welfare benefits.

Participants

Data were collected from 400 participants recruited using Prolific. As pre-registered, we excluded participants who failed bot check and attention check questions ($N = 12$), leaving us

with a total sample size of $N = 388$ ($M_{age} = 36.54$, $SD_{age} = 12.14$, Female = 188, Male = 192, Other = 8). We followed the same powering procedure used in Study 3, which suggested 350 participants were sufficient to detect a small correlation. All respondents were paid an average of \$2.27 for their participation and were debriefed.

Materials

Harm reduction policy support scale. We used the same policy support scale used in Study 3. The gun issue had a Cronbach's alpha of 0.97, the risky sex issue had a Cronbach's alpha of 0.97, and the unemployment issue had a Cronbach's alpha of 0.98.

Moral Opposition

Moral opposition scale. The moral opposition scale matched that of previous studies and had high reliability. Cronbach's $\alpha_{gun} = 0.97$, $\alpha_{risky\ sex} = 0.96$, and $\alpha_{unemployment} = 0.95$.

Judgments of harmfulness scale. The harmfulness scale matched Study 3. The Cronbach's alphas were 0.96, 0.92, and 0.93 for the three issues (gun ownership, risky sex, and unemployment), respectively.

Beliefs about eliminated harm & moral wrongness. We also included additional items to measure whether aversion to harm reduction policy turned on beliefs about harm (vs. moral opposition). We asked, "If there was no harm associated with gun ownership, would it be wrong", rated on a scale from 1 = *Not at all* to 7 = *Definitely*. And the reverse, "If there was no harm associated with gun ownership, would it be acceptable", rated on a scale from 1 = *Not at all* to 7 = *Definitely* ($r = -0.68$, $p < 0.001$).

Moral Acceptance

Moral acceptance index. To measure moral acceptance, we flipped the direction of the items in the moral opposition scale. Representative items include "It is morally right to [issue]"

and “It has always been and will always be acceptable to [issue]”, rated on a scale from 1 = *Strongly disagree* to 7 = *Strongly agree*. The Cronbach’s alphas were 0.96, 0.92, and 0.93 for the three issues (gun ownership, risky sex, and unemployment), respectively. Full list of the items is in the Supplemental Material. We collapsed these items into a single index of moral acceptance for the three issues.

Compassion. We included three additional items to measure compassion. A representative item is “I feel compassion for those who [issue]”, rated on a scale from 1 = *Not at all* to 7 = *Definitely*. The Cronbach’s alphas were 0.96, 0.92, and 0.93 for the three issues (gun ownership, risky sex, and unemployment), respectively. We collapsed these three items into a single index of compassion for the three issues.

Table 3. Correlation matrix for moral opposition, harmfulness, moral acceptance, compassion, counterfactual harm beliefs, & policy support

Measure	1	2	3	4	5	6	7	N
1. Policy support Index	--							388
2. Moral Opposition Index	-.32***	--						388
3. Harmfulness Index	-.09**	.65***	--					388
4. Eliminated harm, still wrong belief	-.35***	.61***	.38***	--				388
5. Moral Acceptance Index	.31***	-.82***	-.64***	-.57***	--			388
6. Compassion Index	.30***	-.72***	-.50***	-.50***	.72***	--		388
7. Eliminated harm, then acceptable belief	.34***	-.53***	-.33***	-.68***	.54***	.50***	--	388

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Demographics. Participants were asked to indicate their preferred gender, age, and political ideology index ($\alpha = 0.96$).

Procedure

The procedure was identical to Study 3.

Results

We pre-registered a replication and extension of Study 3 that included unemployment as a new issue and excluded cigarette smoking. We used the same analysis approach as in Study 3, first examining the relationships between target variables using mixed-effects models (Bates et al., 2015; Kuznetsova et al., 2017; R Core Team, 2019) that specify subject and issue type as random intercepts. We also conducted follow-up analyses on the individual issue level (that included preregistered covariates of age, gender, and political ideology), report a summary of those below, but their extensive analyses are included in the supplemental materials.

Moral Opposition

Moral opposition and policy support

We again found evidence of a statistically significant negative relationship between moral opposition to a behavior and support for harm reduction policy aimed at mitigating the harm associated with that behavior, $b_{opposition} = -0.28$, $SE = 0.02$, $t(1043) = -11.88$, $p < .001$, $r = 0.35$, 95% $CI [-0.33, -0.24]$ (see Figure 7a-b). This pattern again remained statistically significant when harmfulness judgments were included as a covariate ($b = -0.33$, $SE = 0.03$, $t(1096) = -10.28$, $p < .001$, $r = 0.30$, 95% $CI [-0.39, -0.27]$) and issue type as a fixed effect (rather than random effect) with covariates included, $b = -0.25$, $SE = 0.02$, $t(1086) = -10.62$, $p < .001$, $r = 0.31$, 95% $CI [-0.29, -0.20]$. When we included issue type as a fixed effect, covariates, and the interaction term (as in Study 2 and 3), the marginal main effect of moral opposition goes away ($b = -0.06$, $SE = 0.04$, $t(1029) = -1.61$, $p = .108$, $r = 0.05$), but the interaction term is statistically significant, $F(2, 989) = 43.90$, $p < .001$ ⁹.

Harmfulness judgments, moral opposition, and policy support

⁹ An investigation into this difference suggested that it is being driven by the guns issue, which unlike the other two issues, evidences a positive relationship between moral opposition and harm reduction policy support, $b = 0.13$, $SE = 0.06$, $t(1018) = 2.35$, $p = .019$, $r = 0.07$, 95% $CI [0.02, 0.24]$

Next, we examined the relationship between harmfulness judgments and policy support. Mirroring the patterns of Study 3, we found a significant negative relationship between harmfulness judgments and policy support, $b_{\text{harmfulness}} = -0.15$, $SE = 0.02$, $t(1025) = -6.29$, $p < .001$, $r = 0.19$, 95% $CI [-0.20, -0.10]$. The more participants saw a behavior as being harmful, the less they supported harm-reducing policy aimed at mitigating the harm associated with that very behavior (see Figure 8a). When including judgments of harmfulness as a predictor with moral opposition, the relationship between harmfulness judgments and policy support is attenuated ($b_{\text{harmfulness}} = 0.07$, $SE = 0.03$, $t(1094) = 2.13$, $p = .034$, $r = 0.06$, 95% $CI [0.004, 0.13]$)¹⁰.

Fig. 8a. Moral opposition and harmfulness judgments predict negative policy support for the risky sex and unemployment issues. No significant relationships for the gun ownership issue. Shading represents the standard error of the mean. *Note:* Both graphs contain scaled predictor and outcome variables; Issue type was entered as a fixed effect for graphing purposes, but subjects were entered as random. Moral opposition and harmfulness judgments are modeled together (like in Study 3).

¹⁰ Variance inflation factor (VIF) for the model with both moral opposition and harmfulness judgments included simultaneously were below 2.

Fig. 8b. Individual violin plots showing probability density of Policy Support, Moral Opposition, and Harmfulness Judgments by issue type: gun ownership, risky sex, and unemployment.

Eliminated harm, moral wrongness, and policy support

We also explored our interpretation of the suppression effect in Study 3, investigating whether support for policy is negatively related to whether participants thought the behavior would still be wrong if rendered harmless. In line with our interpretation that a behavior would still be morally wrong even if the harm is removed negatively predicts harm reduction support, $b = -0.24$, $SE = 0.02$, $t(1140) = -10.81$, $p < .001$, $r = 0.30$, 95% $CI [-0.28, -0.19]$, similar to moral opposition. And, the more people believe that a behavior would be morally acceptable were it not harmful, the more they supported harm reduction policy, $b = 0.21$, $SE = 0.02$, $t(1131) = 10.02$, $p < .001$, $r = 0.29$, 95% $CI [0.17, 0.25]$.

Moral Acceptance

Moral acceptance and policy support

Results suggested that moral acceptance positively and significantly predicted support for harm reduction policy, $b = 0.31$, $SE = 0.03$, $t(1013) = 11.99$, $p < .001$, $r = 0.35$, 95% $CI [0.26, 0.36]$. The more individuals saw a behavior as morally acceptable and within someone's rights, the more they supported harm reduction policies aimed at mitigating the harm associated with

continuing that behavior. This pattern again remained statistically significant when compassion ratings were included as a covariate ($b = 0.16$, $SE = 0.04$, $t(1117) = 4.15$, $p < .001$, $r = 0.12$, 95% $CI [0.09, 0.24]$) and with issue type included as a fixed effect, $b = 0.31$, $SE = 0.03$, $t(1011) = 11.98$, $p < .001$, $r = 0.35$, 95% $CI [0.26, 0.36]$.

Compassion and policy support

We explored whether feelings of compassion, unlike feelings about harm or moral opposition, predicted support for harm reduction policy. We found that compassion for those who are harmed by a given behavior positively predicts support for harm reduction policy, $b = 0.29$, $SE = 0.02$, $t(1085) = 12.32$, $p < .001$, $r = 0.35$, 95% $CI [0.24, 0.33]$.

Eliminated harm, moral acceptance and policy support

Individual policy analyses

As with Study 3, we report the results for individual policies in the supplement. For risky sex and unemployment, there is a consistent negative relationship between moral opposition and support for harm reduction policy (when the predictor is entered alone, when we control for covariates, and when we control for covariates and judgments of harmfulness). We also find a small negative relationship between judgments of harmfulness and policy support for the unemployment issue (alone and when covariates are included), but no such relationship emerges for risky sex. There were no significant effects for the gun ownership issue. Again, we see variation across the individual issues and over time (see Figure 9).

Fig. 9. Top Panel: Scatter plots and fitted linear regressions for moral opposition and policy support for each issue: gun ownership, risky sex, and unemployment. Bottom Panel: Scatter plots and fitted regression lines for harmfulness judgments of each issue (gun ownership, risky sex, and unemployment) and support for harm reduction techniques. The predictor and outcome variables are scaled for clarity of presentation. Covariates not included. Shading represents the 95% Confidence Intervals.

Internal Meta-Analysis

Finally, to examine the general pattern across time, we conduct a localized meta-analysis (Goh et al., 2016). We followed the procedure and adapted code from previous research (Weidman et al., 2020) to examine the role of issue moralization in predicting lower support for harm-reducing policy across all four studies. The internal meta-analysis revealed a consistent overall effect of moral opposition: As participants reported higher moral opposition to a

behavior, they reported lower support for a harm-reducing policy aimed at that behavior, $b = -0.28$, $SE = 0.02$, 95% $CI [-0.32, -0.24]$. Critically, despite variation in the individual issues across time and studies, the underlying negative relationship was statistically significant and of similar magnitude across all four studies (see Figure 10). Note that this meta-analysis does not include Study 2b in the supplement which included problematic issues that were in hindsight, not harm reduction policy. When we include the four harm reduction issues from the supplemental study (Study 2b), the average effect remains unchanged, $b_{mean} = -.28$, 95% $CI [-.32, -.25]$.

Fig. 10. Meta-analytic relationship between moralization and policy support for each study. Effects are unstandardized betas on a 7-point scale where negative betas indicate an inverse relationship between the predictor (issue moralization) and the outcome variables (harm-reducing policy support). The size of the square for the individual studies is inversely related to the width of the 95% confidence interval, which is indicated by the line span for each study. The overall diamond represents the average of the effects from the four studies. Only participants who completed all issues are included in this analysis. The studies with asterisks include a harmfulness index as a covariate (described in detail in Studies 3-4).

General Discussion

Across four studies, using online convenience, college, and a U.S. representative sample, we found robust correlational evidence for an inverse relationship between moral opposition and harm-reducing policy support, which was robust when modeled with issue type as a random

effect (as preregistered) or as a fixed effect (including the moral opposition and issue type as predictors). The more people morally oppose gun ownership, risky sexual behavior, cigarette smoking, and unemployment, the less they support gun safety training, PrEP, vaping, and welfare benefits as harm reduction strategies to allow people to continue the behavior at reduced risk of harm to themselves and others.

We also measured whether finding a behavior to be morally good or morally acceptable revealed the opposite pattern of results. Our results supported this pattern. The more people found a behavior to be morally acceptable, the more they supported harm reduction policy. That is, the aversion to harm reduction strategies is not a product of moralization per se, but of a specific kind of moralization—moral opposition.

We also sought to better understand how moral opposition and judgments of harmfulness each contribute to support for harm-reduction policy. This question presented a puzzle. On the one hand, many behaviors are deemed morally wrong exactly because they are harmful. We might expect that reducing the harm associated with the behavior might make render the behavior more (or completely) acceptable, and so the strategy itself becomes more acceptable. On the other hand, once a behavior is deemed morally wrong, many meta-ethical features follow from that judgment, including that the behavior is wrong regardless of whether an authority says it is acceptable or not, and that the issue is no longer nuanced, it is uncomplicated, simply wrong. In that case, harm-reduction is not an acceptable strategy for changing behavior—it may even appear to condone it. To get at this puzzle, we measured meta-ethical moral opposition as well as harmfulness judgments of gun ownership, risky sexual behavior, and cigarette smoking in Studies 3 and 4 and included items in Study 4 to specifically test whether this latter sentiment is capturing the pattern for moral opposition. And indeed, our results supported this logic. We

found evidence for a suppression effect for both risky sexual behavior and gun ownership, suggesting that people who see the target behavior as harmful (but are otherwise unopposed to it) are more likely to support a harm-reduction strategy. We confirmed this interpretation with face-valid survey items: People who believe that the behavior would still be wrong, even if it were rendered harmless, also tend to oppose harm reduction policy. For those who believe the behavior would be acceptable if rendered harmless, they tend to support the proposed harm-reduction policy.

Notably, we were able to capture some variation in harm reduction policy support as a function of real time cultural and informational shifts. That is, we collected data on vaping policy support before, during, and after the news cycle about vaping-related lung illness in 2019. While there is variability among the different issues over time and with separate samples, the public discourse surrounding vaping allowed us the opportunity to look at one possible explanation for this variation. When data collection took place during the news cycle for vaping-related lung illness, support for vaping as a viable harm reduction strategy went down dramatically. After this cycle was over, and it was no longer the most salient health concern (likely overshadowed by the COVID-19 pandemic), we again observed the negative relationship between moral opposition and policy support. When it was salient that vaping was potentially dangerous, the relationship went away, and when it was no longer salient, it returned but the information gained that vaping may be harmful seemed to persist (as seen in the negative relationship between harmfulness judgments and policy support for cigarettes only, see Figure 5a). It is possible that something similar may explain the deviation in gun ownership that we saw in Study 4. Those data were collected during news cycles about increasing crime and gun violence across the United States (e.g., Mozes, 2021). The heightened salience of the issue may have shifted people's opinions

toward the harm reducing strategy. Overall, the news cycle around vaping highlights some important issues. First, it is interesting to see the news cycle affect individual judgments (though not permanently). Second, when we study moral judgments about real issues in real time, we should expect some variation, including some sensitivity to news coverage, and lack thereof. Indeed, we found variation not only in the relationship between moral opposition and policy support for vaping, but also for gun ownership and risky sexual behavior, which are not as easily explained by media narratives.

Implications

We often expect moral messages to be persuasive precisely because our moral values are close to the heart (e.g., Moral Matching Hypothesis; Drolet & Aaker, 2002; Fabrigar & Petty, 1999; Feinberg & Willer, 2013; Ferrari & Leippe, 1992; Luttrell et al., 2019; Ringel & Ditto, 2019, but see Leidner et al., 2018). Yet, the present findings suggest that appealing to morality to garner support may also yield opposition. This is keeping with other findings that people with strong ideological beliefs are often averse to solutions offered for issues associated with those strong beliefs (Campbell & Kay, 2014) and sacred values (Ginges et al., 2007). Caution is needed when policymakers attempt to galvanize support for their policies with moral appeals (see Crockett, 2017) as they may have unintended consequences (see Alderman et al., 2010 for discussion on the danger of morality in policy disputes).

This work also has a number of important implications for the study of morality. We developed a novel scale of meta-ethical moral opposition. The purpose of the scale was to measure moral opposition irrespective of endorsement of any particular moral value. We compiled decades of scholarship on morality to create a novel meta-ethical moral opposition scale which captures the many facets of moral cognition and moral emotions (Skitka & Mullen,

2002; Skitka et al., 2005; Tetlock et al., 2000; Rozin, 1999; Goodwin & Darley, 2008; Turiel, 1983) and can be potentially adapted to measure moral opposition to any behavior without needing to know *why* a given person opposes it. We used our novel scale to investigate the role of morality as it relates to real-world issues of gun ownership, cigarette smoking, risky sex, and unemployment in online convenience, college, and U.S. representative samples. We chose these issues because we knew they were relevant to policy at the time we measured them (and indeed, legislation passed about vaping while we were collecting data), because there is variation in opposition, including by political ideology, and because we thought they might give us novel insight into the complex relationship between moral opposition and judgments of harmfulness.

Our research poses the intriguing possibility that moral opposition has at least two forms. Some people might find behaviors to be wrong to the extent that they are harmful, and so once they are no longer harmful then they are no longer wrong. In this case, if it possible to engage in smoking without harming the self or others then smoking is not wrong. Others might find that their moral opposition to smoking is not limited to its harmfulness (even if learning that smoking is harmful was the original reason to morally oppose it). In this case, people might be more likely to say that smoking is wrong regardless of who says it is okay, and they might find it easy to think of both moral and non-moral reasons why smoking is bad (Rozin, 1999). Even harmless smoking is still unacceptable; perhaps it has passed a threshold into moral wrongness that even rendering the behavior harmless cannot undo. Finally, this research also supports the notion that judgments of harm and morality are entwined but separable (see also Skitka et al., 2018). Indeed, it may even suggest multiple pathways to moral opposition, perhaps one that is rooted in judgments of harmfulness, another related to sacredness (see Scott et al., 2018 for review; Scott et al., 2016; but see Royzman et al., 2017), and even another in meta-judgments of

universalization (e.g., Levine et al., 2020). Despite the high correlation between meta-ethical moral opposition and harmfulness judgments, these (and likely other) dissociable features of moralization suggest that moral opposition is equifinal (e.g., Feinberg et al., 2019).

Limitations

One limitation of our research is that we did not explicitly measure how effective our participants thought the harm-reduction strategies would be at making the behaviors less harmful. It is possible that participants did not believe that the strategies we suggested would be effective or they might have other preferred strategies for the behavior such as prevalence (vs. harm) reduction (MacCoun, 2013). In this case, people may perceive that there is just one opportunity for getting a specific policy enacted and so potential policies are seen as mutually exclusive. Finally, we also did not measure participants' judgments of how risky each behavior is, which might explain some of the lack of support for harm-reduction policy. We did, however, measure how dangerous people thought each behavior was. This item did not affect the pattern of results or reliably relate to harm-reduction policy support.

It should also be noted that we did not originally set out to study the relationship between moral opposition and harm-reduction policy over time, nor did we expect to see the amount of variation in individual issues that we did. The results of individual issues across studies were dynamic but were also difficult to find post-hoc (or *a priori*) explanations for (see Dorfman, 2021). However, we hope that the variation nonetheless demonstrates that many outside features (e.g., news coverage, pandemics, etc.) may push around people's moral opinions when issues are pulled from the real-world. Another limitation is that our methods are purely correlational, which restricts the causal conclusions that can be drawn from these data.

Future Directions

This research is one step in better understanding moral opposition. One important future direction is to further validate our scale of meta-ethical moral opposition, ideally predicting behavior such as avoiding engagement in the behavior or others who do. Another is to further examine the role of harmfulness judgments. We separately investigated the role of harmfulness judgments here because harmfulness judgments are an important aspect of moral cognition (Schein & Gray, 2016) and harm reduction policies are explicitly (and literally) about reducing harm. It is also possible to compare harmfulness judgments to other value judgments like how much the behavior violates values related to sanctity, loyalty, equality or others (Graham et al., 2011) and perhaps differences in which values a behavior violates could also differentially predict support or opposition to harm-reduction policy. For example, heightened purity concerns are associated with negative attitudes towards needle exchange programs, a harm reduction policy aimed at opioid addiction (see Christie et al., 2019), and this type of investigation might shed further light on the factors that go into moral opposition. Finally, it is also important to further investigate moral opposition as it pertains to risk (e.g., Royzman et al., 2017; Cusimano et al., 2018). Overall, future research would benefit from continuing to put contemporary policy issues and theorizing in moral psychology into more frequent conversation.

In sum, we find robust evidence of an inverse relationship between moral opposition to a behavior (over and above how harmful the behaviors appear) and support for harm-reducing policy aimed at that behavior. Moreover, we found evidence for more than one kind of moral opposition with consequences for policy support: Opposition based in judgments of harm (besides which the behavior is acceptable) positively predict support for harm reduction policy, whereas judgments of moral opposition (even if the behavior were harmless) negatively predict support for harm-reduction policy. In sum, the more that people morally oppose gun ownership,

risky sexual behavior, unemployment, and cigarette smoking, the less they support gun safety training, PrEP use, welfare, and vaping. That is, until news broke that vaping itself was harmful, and this relationship disappeared.

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Author Contributions

JW and AG conceptualized the study, the study design, and collected the data. JW conducted the analyses and drafted the manuscript with critical revisions from AG. JW and NS conducted the exploratory factor analysis, and NS contributed to writing and editing. All authors provided feedback on the manuscript.

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