

# Science, Sexuality, and Civil Rights: Does Information on the Causes of Sexual Orientation Change Attitudes?

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Does learning that homosexuality is innate increase support for gay rights? Because there is a strong correlation between the belief that people are “born gay” and support for gay rights, many assume the former causes the latter. However, correlation does not equal causation. Drawing on data from a US-representative experiment, we examine whether exposure to scientific information on the origins of sexual orientation influences attitudes toward gay people and support for gay rights. The information influenced participants’ beliefs about the causes of homosexuality but had no impact on their attitudes. Further, belief change was contingent on ideology—liberals were more persuaded by information that people are born gay, and conservatives by information that people are not born gay. In the contemporary context, shifting causal attributions may not lead to attitude updating; rather, broad political values may act as a cognitive filter, biasing the uptake of new information about sexual orientation.

**q1** Among the most well-established associations in survey research on the American public today is the positive correlation between innate or biological explanations for sexual orientation and support for gay rights (Haider-Markel and Joslyn 2008) as well as political liberalism more generally (Garretson and Suhay 2016). The relationship is not only consistent but also substantively large. For example, Haider-Markel and Joslyn (2008) find that causal attributions for homosexuality explain more variance in affect toward lesbian and gay men and attitudes toward gay rights than any other independent variable in their model, including being a born-again Christian and knowing a gay person.

On the basis of this correlation, conventional wisdom assumes that divergent causal attributions for sexual orientation in the public are driving divergent attitudes. In other words, it is often assumed that one reason for why some Americans are pro-gay (vs. anti-gay) is that they first adopt the belief that some people are born gay (vs. an alternate view) and then up-

date their attitudes related to lesbians and gay men accordingly.<sup>1</sup> A wide range of people assert the factual-belief-to-attitude causal path, from bench scientists to journalists to celebrities (Walters 2014). This assumption has encouraged gay rights activists to incorporate biological claims about sexual orientation into their discourse and gay rights opponents to challenge scientific claims that homosexuality is at least in part innate (Walters 2014).

Yet, correlation does not imply causation. Perhaps the best evidence for this causal effect is the fact that, in the aggregate, rapidly increasing tolerance toward lesbians and gay men in the 1990s and 2000s followed the publication of many scientific studies showing evidence for biological influences on sexual orientation (Garretson and Suhay 2016). However, beyond this, little published social scientific evidence exists to back up the assumption that changing people’s minds about the origins of sexual orientation shifts gay rights attitudes. This is because nearly all of the studies on the topic are observational.

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Data and supporting materials necessary to reproduce the numerical results in the article are available in the JOP Dataverse (<https://dataverse.harvard.edu/dataset/jop>). An online appendix with supplementary material is available at <http://dx.doi.org/10.1086/694896>. In conducting this human subjects research, the authors complied with relevant law and received approval from the Institutional Review Board at the lead author’s home institution. Support for this research was provided by Time-Sharing Experiments for the Social Sciences.

1. Believing homosexuality is innate could bolster pro-gay attitudes for many reasons, e.g., genetic attributions tend to “excuse” associated behavior (Haider-Markel and Joslyn 2008).

The handful of experiments that have been published (all with small convenience samples of college students) suggests that reactions to information that people are born gay or straight differ according to who the receiver is (for an overview, see Boysen and Vogel 2007). These contingent responses are suggestive of motivated reasoning, a possible alternative explanation for the belief-attitude correlation under study whereby values drive factual beliefs, rather than the reverse (Kahan 2016). Such bias is increasingly being documented with respect to the formation of politically relevant factual beliefs, including causal attributions (Morgan, Mullen, and Skitka 2010). Scholars have found left-right political ideology, partisanship, and broad value commitments to have a potent biasing effect (Garretson and Suhay 2016; Kahan 2016; Morgan et al. 2010). Politically motivated reasoning is particularly common among those with more knowledge or interest in a subject (Kahan 2016).

## HYPOTHESES

Based on the above, three sets of causal hypotheses warrant careful testing.

**H1.** (Informational Persuasion). Exposure to information that homosexuality is innate (not innate) will lead to on-average increases (decreases) in the belief homosexuality is innate.

**H2.** (Biased Assimilation of Information). Liberals will be more likely to accept innate attributions than conservatives, and conservatives to accept choice/environment attributions than liberals (**H2a**).<sup>2</sup> Effects will be greatest among those most interested in the topic (**H2b**).

**H3.** (Attitude Updating). Exposure to information that homosexuality is innate (not innate) will shift attitudes on gay rights in a progressive (conservative) direction (**H3a**). Such attitude shifts, should they occur, will be mediated by changed causal beliefs (**H3b**).

## EMPIRICAL ANALYSES

### Study design and measures

To test the above hypotheses, we conducted an online experiment with a mixed within- and between-subjects design, carried out by GfK/Knowledge Networks. A representative sample of US adults ( $N = 644$ ) was randomly assigned to read (A) no information (control group), (B) scientific information

that people are “born gay,” or (C) scientific information that people are not “born gay” but rather “choose” to be gay or become gay in response to their social environment. These treatments describe actual scientific findings that have been publicized in the news media, giving the study strong external validity. The full treatments are available in appendix A (apps. A–E are available online).<sup>3</sup> Note that all analyses reported include only participants who conveyed that they had read and understood the treatment in a manipulation check.<sup>4</sup>

The dependent measures fall into four groups: beliefs about the causes of homosexuality, support for gay rights, opinions on the morality of homosexuality, and evaluations of lesbians and gay men. Each measure appeared in the pre-treatment questionnaire, conducted several weeks before the stimuli (to avoid anchoring), and the posttreatment questionnaire immediately after the stimuli. This combines the best attributes of between- and within-subjects designs: statistical models compare treatment and control group means on the dependent variables—measured in the posttest—while controlling for each participant’s value on the dependent variable (DV) from the pretest (i.e., a lagged DV). This allows us to estimate effects efficiently and capture on-average change between pretest and posttest in the treatment groups (compared to the control group).

The Causal Attribution measure includes five responses to the question: “What do you believe causes homosexuality?” High values represent greater belief that homosexuality is innate. The Gay Rights measure is the average of responses to three questions on gay marriage, civil unions, and whether gay couples should be allowed to adopt children. The Gay Morality measure is the average of responses to three questions on whether homosexuality should be accepted by society, whether it is morally wrong, and how one would react to having a gay child.<sup>5</sup> These variables have been recoded to range from 0 to 1. Higher values represent greater support for gay rights/tolerance. The Thermometer Difference measure subtracts a feeling thermometer score for heterosexuals from one for homosexuals. The range is  $-1$  to  $1$ . Positive values reflect warmer scores for gay people; negative values reflect warmer scores for straight people. Measures have been drawn from the American Na-

2. We posit left-right ideology as a moderator, following Garretson and Suhay (2016).

3. Randomization balanced the experimental groups on important characteristics (demographics, ideology, attitudes toward lesbians and gays). In a series of ANOVAs, all  $F > .2$ .

4. Estimates change only slightly if all participants are included.

5. We use attitude scales to present results efficiently and reduce measurement error. All Cronbach’s alphas are equal to or greater than .87. See app. C for disaggregated results.

tional Election Study, Gallup, and Pew Research Center. See appendix B for wording.

In a pretreatment, we asked how interested participants were in “the topic of heredity and genetics.” We also use GfK measures administered before our study: ideology (liberal, moderate, or conservative self-placement), age, sex, race/ethnicity, education, and religiosity.

## Results

**Informational persuasion.** We first regress posttreatment responses to the causal attribution question on two dummy variables representing the treatments. The control group is the excluded comparison group. As discussed, we control for pretreatment causal attributions, meaning coefficients on the treatment variables effectively represent the extent to which treated participants changed between pretest and posttest, on average, relative to the control group.<sup>6</sup> Results are in table 1. Model 1 includes only the treatments and lagged DV; model 2 includes controls.

Information on the causes of homosexuality persuaded participants, on average. Coefficients on both treatment variables are signed as expected and statistically significant (biology = .05,  $p < .05$ ; not biology =  $-.16$ ,  $p < .001$ ). Biological information moved participants only slightly (5% of the scale on average) in the direction of biology, whereas “not biology” (choice/environment) information moved participants three times as much (16% of the scale on average) in the opposite direction.<sup>7</sup> Hypothesis 1 is supported.<sup>8</sup>

**Biased assimilation of information.** Next, we investigate whether the on-average informational persuasion (hypothesis 1) may be hiding heterogeneous effects among participants driven by their political ideology (hypothesis 2). To test this, we incorporate a three-point measure of left-right political ideology, centered at 0 (moderates) with a range of 1 ( $-.5$  to  $.5$ ). Liberals receive high values. We repeat the analysis of table 1, model 2, but add interactions between the treatments and ideology. Because ideology is an observed variable, it is important to include demographic controls. If hypothesis 2a is supported, the interaction term coefficients

should be positive and statistically significant, signaling ideological polarization over the perceived causes of homosexuality. Both coefficients are positive, although only one (the biology treatment) reaches significance ( $p < .05$ ; see table 1, model 3).<sup>9</sup> Thus, hypothesis 2a receives partial support.

To test hypothesis 2b, we divide the sample in half according to stated interest in genetics and reestimate the equation (see table 1, models 4 and 5). We find that both treatment effects are moderated by political ideology among the half of the sample most interested in genetics ( $p < .05$ ). There is no evidence of moderation among low-interest participants.

In figure 1, we visualize the model 5 results, showing how the treatment effects differ by ideology among high-interest participants: in response to the “born gay” treatment, liberals became more likely to say people are born gay (effect sizes of 10%–20% of the scale), but conservatives did not; in response to the “not born gay” treatment, conservatives became more likely to say people are not born gay (effect sizes of 20%–30% of the scale), but liberals did not. Both high-interest conservatives and liberals resisted “inconvenient” information.<sup>10</sup>

**Attitude updating?** To investigate hypothesis 3a, we estimate the average treatment effect for the three attitudinal DVs—Gay Rights, Gay Morality, and Thermometer Difference. We again control for pretest attitudes. Results are in table 2. Here, we find almost no evidence that people update their attitudes in response to the informational stimuli. The biology treatment had a small effect on Gay Rights ( $b = .03$ ,  $p < .05$ ), but the other treatment effects are inconsistently signed and not statistically significant.<sup>11</sup> We conducted a formal analysis using the R package mediation to assess whether the small positive effect of the biology treatment on support for gay rights is mediated through changes in participants’ causal attributions (see app. C, tables 1 and 2). There is no support for mediation (hypothesis 3b). The indirect effect of the treatment on gay rights via changed attributions is exactly zero.

We also investigated whether the diverging attributions among liberals and conservatives are the reason for these null results. It is possible that mirror opposite trends in factual be-

6. Ordered probit results, which corroborate our findings here, are available in app. C.

7. One possibility for why effects were lopsided is that the current information environment is saturated with claims that homosexuality is innate, making the “not innate” information more novel. Novel stimuli are often more powerful (Harrison and Michelson 2017).

8. If we exclude the lag and analyze the posttest data as between subjects, the findings are similar (control  $m = .58$ , biology  $m = .63$ , not biology  $m = .39$ ). See app. D.

9. The same pattern is evident if we compare posttest means. See app. D.

10. We also examined whether bias was driven by participants’ pretest attitudes toward gay people/gay rights or their party identification; coefficients on these interaction terms were null.

11. Again, if we exclude the lagged DVs, the findings are similar, with negligible differences between control group and treatment group means on the attitude DVs. See app. D.

Table 1. Influence of Treatments on Posttest Attributions and Moderation by Ideology

	Model 1	Model 2	Model 3	Model 4 Low Interest	Model 5 High Interest
Biology	.054* (.022)	.050* (.021)	.053* (.021)	.066* (.033)	.039 (.029)
Not biology	-.160*** (.022)	-.161*** (.022)	-.159*** (.022)	-.166*** (.034)	-.155*** (.029)
Pretest attributions	.691*** (.027)	.619*** (.028)	.614*** (.029)	.561*** (.040)	.681*** (.041)
Liberalism × biology			.132* (.066)	.065 (.100)	.215* (.089)
Liberalism × not biology			.091 (.068)	-.010 (.107)	.196* (.088)
Liberalism		.061* (.031)	-.010 (.048)	.066 (.071)	-.083 (.066)
Age (older)		-.027 (.040)	-.029 (.040)	.003 (.061)	-.038 (.053)
Male		-.039* (.018)	-.036* (.018)	-.065* (.027)	-.009 (.024)
Hispanic		-.094*** (.028)	-.096*** (.028)	-.119** (.042)	-.076* (.037)
Black		.058 (.031)	.061* (.031)	.012 (.045)	.111** (.041)
Education		.108*** (.031)	.108*** (.031)	.145** (.048)	.084 (.043)
Religiosity		-.129*** (.028)	-.133*** (.028)	-.178*** (.040)	-.086* (.039)
Constant	.175*** (.022)	.257*** (.035)	.261*** (.035)	.299*** (.048)	.207*** (.051)
Observations	565	562	562	280	281
Adjusted R <sup>2</sup>	.583	.619	.621	.603	.637

Note. Standard errors in parentheses.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

lief change among liberals and conservatives led to “updated” attitudes that, in the aggregate, canceled each other out. Thus, we regressed the three attitudinal DVs (in separate analyses) on the treatment dummy variables and their interactions with

ideology (along with ideology alone, pretreatment attitudes, and demographic controls). The coefficients on the interaction terms were near zero and nonsignificant (including among the high-interest participants). In other words, while the treat-

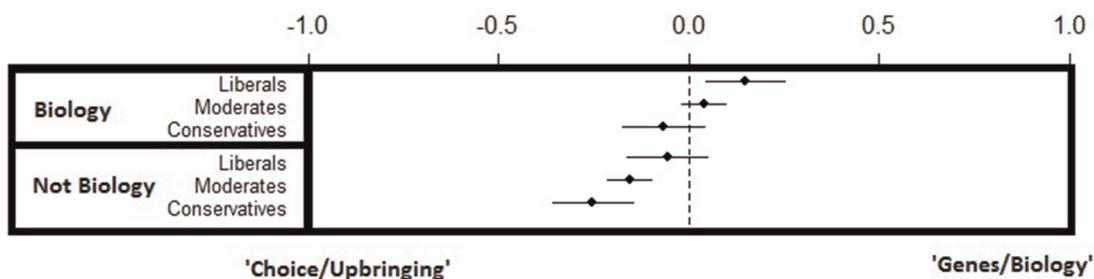


Figure 1. High-interest participants resist ideologically uncongenial information.

Table 2. Treatments Have Almost No Effect on Gay Attitudes

	Gay Rights	Gay Morality	Thermometer Difference
Biology	.030* (.012)	.018 (.015)	-.027 (.022)
Not biology	-.012 (.013)	-.018 (.015)	.006 (.022)
Pretest gay rights	.905*** (.015)		
Pretest gay morality		.899*** (.019)	
Pretest thermometer difference			.707*** (.029)
Constant	.050*** (.012)	.061*** (.015)	-.035* (.016)
Observations	558	552	577
Adjusted R <sup>2</sup>	.860	.809	.505

Note. Standard errors in parentheses.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

ments polarized attributions for sexual orientation along ideological lines, they did not polarize gay rights attitudes (see app. C, table 4).

## DISCUSSION AND CONCLUSION

In sum, exposure to scientific information about the causes of homosexuality shifted factual beliefs on average; among those most interested in the topic, persuasion was biased by political ideology. These findings reflect emerging wisdom from the science communication literature that motivated reception of factual information is common and usually contingent on broad ideological commitments, which act as a powerful filter for information because they are affectively charged and linked to people's social identities (e.g., Kahan 2016).

Despite these changing attributions, participants did not update their attitudes related to lesbians and gay men. It is possible the null results reflect attitude stabilization or over-familiarity with some of the information we presented—in other words, our study might have yielded different results if conducted in years past. However, note too that the results accord with research suggesting that politicized factual beliefs play a post hoc justificatory role, not a causal one, in political belief systems (Kahan 2016; Morgan et al. 2010).

Scholars increasingly recognize the importance of publishing null results from quality studies to avoid biasing collective knowledge.<sup>12</sup> Some gay rights activists have incorporated information on the origins of homosexuality into efforts to increase tolerance (Walters 2014); our study suggests they should focus on alternate persuasion strategies with a track record of success, such as the inclusion of more gay characters in media (Garretson 2015) or telling people about members of their in-groups who support gay rights (Harrison and Michelson 2017).

## ACKNOWLEDGMENTS

For helpful comments and suggestions, we wish to thank Emily Bello-Pardo, Pat Egan, and Erin Nash, as well as anonymous reviewers at Time-Sharing Experiments for the Social Sciences and the *Journal of Politics*. Previous versions of this manuscript were presented at the 2016 Political Psychology SPSP preconference and the 2015 NYU-CESS Conference on Experimental Political Science.

## REFERENCES

- Boysen, Guy A., and David L. Vogel. 2007. "Biased Assimilation and Attitude Polarization in Response to Learning about Biological Explanations of Homosexuality." *Sex Roles* 57:755–62.
- Garretson, Jeremiah. 2015. "Exposure to the Lives of Lesbians and Gays and the Origin of Young People's Greater Support for Gay Rights." *International Journal of Public Opinion Research* 27 (2): 277–88.
- Garretson, Jeremiah, and Elizabeth Suhay. 2016. "Scientific Communication about Biological Influences on Homosexuality and the Politics of Gay Rights." *Political Research Quarterly* 69:17–29.
- Haider-Markel, Donald P., and Mark R. Joslyn. 2008. "Beliefs about the Origins of Homosexuality and Support for Gay Rights: An Empirical Test of Attribution Theory." *Public Opinion Quarterly* 72 (2): 291–310.
- Harrison, Brian F., and Melissa R. Michelson. 2017. *Listen, We Need to Talk: How to Change Attitudes about LGBT Rights*. New York: Oxford University Press.
- Kahan, Dan M. 2016. "The Politically Motivated Reasoning Paradigm." Pt. 1, "What Politically Motivated Reasoning Is and How to Measure It." In Robert Scott and Stephen Kosslyn, eds., *Emerging Trends in the Social and Behavioral Sciences*. New York: Wiley, 1–16.
- Morgan, G. Scott, Elizabeth Mullen, and Linda J. Skitka. 2010. "When Values and Attributions Collide: Liberals' and Conservatives' Values Motivate Attributions for Alleged Misdeeds." *Personality and Social Psychology Bulletin* 36:1241–54.
- Walters, Suzanna Danuta. 2014. *The Tolerance Trap: How God, Genes, and Good Intentions are Sabotaging Gay Equality*. New York: New York University Press.

12. To sum up the robust nature of these null results, they do not stem from (a) any limitation in detecting small effect sizes, (b) participants' resistance to changing their factual beliefs (many did) or failure to understand the treatments (participants passed a manipulation check), (c) measurement problems (we included three attitude scales based on validated measures, and results remained null when scales were disaggregated), or (d) particularities in the design (they occurred whether we analyzed the data as within or between subjects).

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