

Two-Sided Sensitivity Bias in Surveys: A List Experiment on Same-Sex Marriage in Argentina

Gustavo Díaz* Jordi Díez† Michelle L. Dion‡

Abstract

Researchers rely on indirect questioning techniques to minimize misreporting in the measurement of sensitive survey questions. Most techniques used to accomplish this task assume one-sided lying. However, in the context of support for contentious policies, applications may suffer from two-sided sensitivity, meaning that different groups may tend to over or understate their support. This implies that aggregate prevalence estimates can suffer from attenuation bias, increasing the chance of false negative findings. Moreover, most studies using indirect questioning techniques are not well equipped to detect the heterogeneity that underlies two-sided sensitivity. We illustrate these issues through an application of a list experiment on support for same-sex marriage after legalization in Argentina and conclude with guidelines to address two-sided sensitivity in surveys.

Word count: 4015 (including references).

*Postdoctoral Fellow. Department of Political Science. McMaster University. Email: diazg2@mcmaster.ca

†Professor. Department of Political Science. University of Guelph. Email: jordi.diez@uoguelph.ca

‡Professor. Department of Political Science. McMaster University. Email: dionm@mcmaster.ca

1 Introduction

Sensitivity bias can complicate the measurement of attitudes about contentious policies or issues in surveys. Often, the concern is that respondents will be reluctant to admit that they support an unpopular policy, leading to underestimation of support (Lax, Phillips, and Stollwerk 2016; Rosenfeld, Imai, and Shapiro 2015). As a result, various methods to address potential measurement error due to sensitivity bias, such as list experiments and the randomized response technique, assume one-sided lying (Blair 2015). For example, the “no liars” assumption in list experiments requires one to believe that respondents can only *understate* support for the sensitive item (Blair and Imai 2012).

However, in some applications respondents may also *overstate* their support when asked their opinion directly. This presents the researcher with the problem of two-sided sensitivity bias, which implies that different subgroups in survey may under or overstate a sensitive attitude or behaviors. The consequence of this phenomenon is that techniques relying assuming one-sided lying will lead to biased prevalence estimates. In the extreme case, opposite patterns across subgroups may cancel out, leading to false negative results.

We examine these measurement issues for list experiment estimates in the context of attitudes toward Same-Sex Marriage (SSM) in Argentina five years after legalization. This is a context where the social cleavages that underlie support for a sensitive policy are well-defined and understood, so we can derive reasonable expectations about which types of respondents are most likely to understate or overstate their support. Moreover, previous research already hints at potential two-sided sensitivity bias in other contexts (Lax, Phillips, and Stollwerk 2016).

While the legalization of SSM in Argentina was politically divisive in 2010, some research suggests that legalization and subsequent contact with married same-sex couples may have normalized support for SSM among those previously opposed to the expansion of marriage rights, particularly through social contact with same-sex married couples (Dion and Díez

2022). Other research suggests that the expansion of formal rights, like SSM, is associated with more positive public attitudes toward LGBT+ people because they provide legitimacy to LGBT+ rights claims or suggest public consensus (Flores and Barclay 2016; Abou-Chadi and Finnigan 2019). In such cases, policy adoption may reduce sensitivity bias among those who previously *understated* their support for SSM. At the same time, some others, particularly those who originally opposed SSM, may now feel social pressure to express support, even though they remain opposed, creating pressure to *overstate* support.

As our application shows, the main challenge is that most studies applying indirect questioning techniques to minimize sensitivity bias, including list experiments, are not designed to capture two-sided sensitivity explicitly. Therefore, even when the determinants of two-sided sensitivity are known in advance, the typical study will not be well-equipped to detect these heterogeneous effects. We compare responses to direct and list experiment questions to determine whether respondents over- or under-state their true support for SSM. Our results suggest differences in the sensitivity of supporting SSM along two key demographic factors generally associated with SSM attitudes: gender and religious practice. However, our design, like most studies, does not allow us to determine if these differences are significant by conventional standards.

Overall, our findings suggest that aggregate estimates from indirect questioning techniques suggesting no response bias may belie two-sided sensitivity across subgroups. Moreover, studying this heterogeneity requires researchers to design studies aimed at measuring two-sided sensitivity deliberately.

2 Background and Research Design

2.1 Argentina's legalization of SSM

A national debate ignited in Argentina in October 2009 when a bill was introduced in Congress to allow for SSM. While the bill stalled at the committee level for lack of presidential support, courts began to rule Civil Code provisions indicating that restricting marriages to between men and women violated constitutional equal-protection guarantees (*Clarín*, November 12, 2009). Debate intensified when, in February 2010, a Supreme Court judge signaled in a media interview that the Court was prepared to rule favorably on SSM because its prohibition did not pass constitutional muster (*Página 12*, February 15, 2010).

Within this context, the bill was reintroduced to Congress for debate. Proponents of SSM framed it as a matter of human rights (Schulenberg 2012). Arguments against SSM, led by Catholic Church leadership, framed SSM as a moral issue (Vaggione 2010, 941). These arguments were supported by a national alliance of Evangelical Churches which, in collaboration with the Catholic Church leadership, organized significant protests as the bill was debate in parliament (*El País*, July 13, 2010).

Armed with these policy frames, proponents and opponents of SSM lobbied legislators and mobilized on the streets as debate resumed in Congress (Díez 2015). After heated debate, 126 votes were cast in favor of legalization, 110 against, and 4 abstentions (Schulenberg 2012). The bill then moved to the Senate. It held public hearings with testimony by experts or advocates, including scientists and religious leaders. In late June, LGBT activists rallied in front of Congress to present a list of organizations, public figures and personalities that had declared their support for SSM (*Página 12*, June 29, 2010). Meanwhile, religious groups changed their strategy, supporting civil unions (*Clarín*, June 1, 2010), organizing protests in front of Congress (*Clarín*, June 1; *La Nación*, June 4, 2010), and calling for a referendum on SSM, convinced that a majority of Argentines opposed SSM. After 14 hours of debate,

the Senate approved the measure 30 votes in favor, 27 against. On July 21, 2010, President Fernández de Kirchner promulgated the law, making Argentina the first country in Latin America to legalize SSM nationally.

According to a nationally representative survey fielded March 1 through April 28, 2010, public attitudes were highly polarized along the lines of elite and movement discourse and constituencies (Latin American Public Opinion Project (LAPOP) 2010). When asked whether they approve the statement that same-sex couples should have the right to marry, on a scale from strongly disapprove (one) to strongly approve (ten), the mean response was 6.19 (CI: [6.01, 6.38]). The most common response was strongly approve (or 10, $n = 423$, proportion = 0.31), and the second common response was strongly disapprove (or 1, $n = 296$, proportion = 0.22). See also SM Table A1 and Figure A1. Regressing a binary measure of approval in 2010 on religion, gender, age, residence location, education, democratic values and left ideology highlights the strong association between these characteristics and SSM approval (see Figure 1). For example, people who identified as Evangelical Christians (including Mormons and Jehovah’s Witnesses), practicing Catholics (who attend religious services at least once a month), and non-practicing Catholics respectively had 75%, 45%, and 38% lower odds of approving of SSM compared to adherents of other religions or non-believers, the reference category. Other results, such as for gender, age, and education, are consistent with other research on attitudes toward same-sex marriage in the region Chaux et al. (2021) and elsewhere (Adamczyk and Liao 2019).

2.2 List experiment

The preceding narrative highlights the degree of polarization in public and elite opinions at the time of SSM legalization, which can lead to misreporting in opinion surveys due to sensitivity bias. As we outline in the next sub-section, we expect legalization of SSM to induce or reduce sensitivity bias in opposite directions across different subgroups.

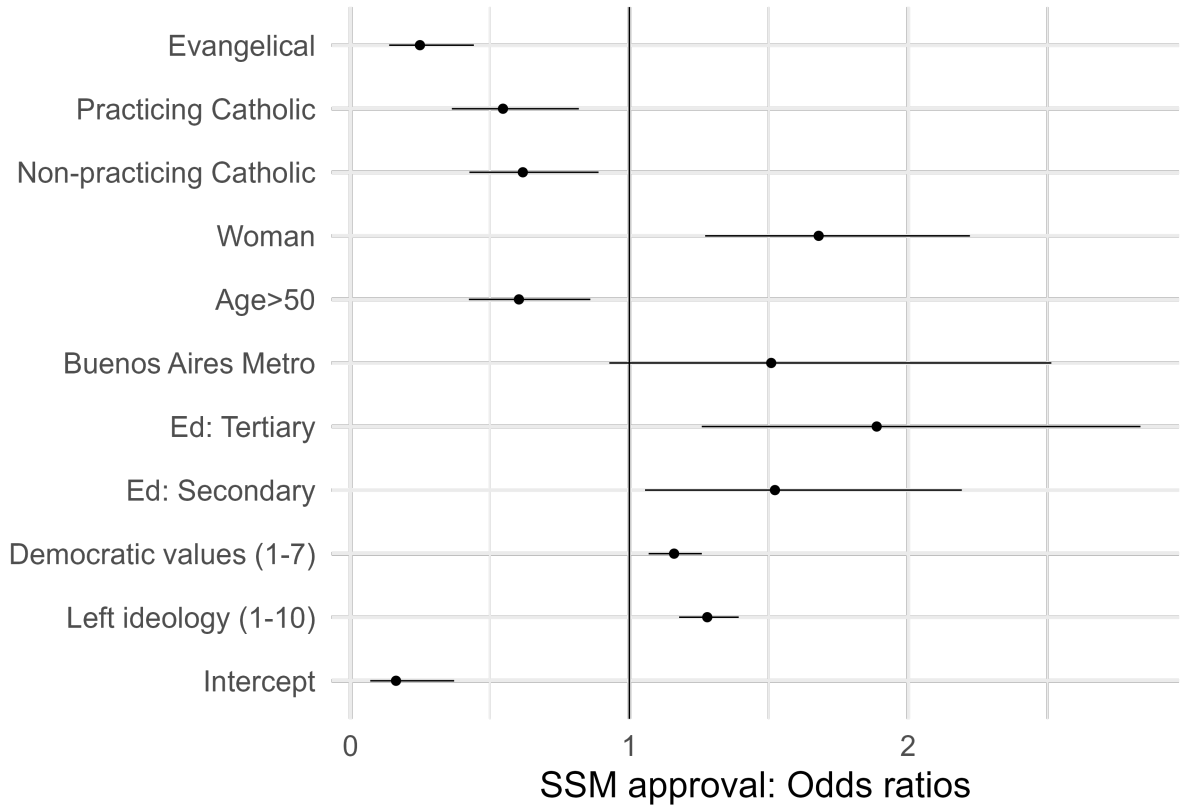


Figure 1: Approval of same-sex marriage in 2010: Logistic regression odds ratios
Note: Error bars denote 95% confidence intervals. See also SM Table A4.

To account for the potential sensitivity bias, we included a list experiment in the first wave of the Argentine Panel Election Study (APES) in June 2015. This wave included a nationally representative sample of 1200 respondents. The list experiment is an indirect questioning technique designed to elicit truthful responses to sensitive questions in surveys (Miller 1984). Our list experiment appeared early in the survey and before any mention of SSM.

Respondents were randomly assigned to control and treatment. Each group was presented with a list of statements and were asked how many, but not which ones, they agree with. Table 1 shows the list of statements presented to respondents each experimental condition. See Section B of the SM for the original question wording in Spanish and Table B1 for descriptive statistics of key covariates across treatment groups.

We chose the list of baseline items following standard practices in the literature to avoid

Table 1: List experiment design

	Control list	Treatment list
1	The government spends too much money to fight poverty	The government spends too much money to fight poverty
2	Public security is a big problem in our country	Public security is a big problem in our country
3	The government has eliminated corruption in our country	The government has eliminated corruption in our country
4	The government should reduce corporate taxes	The government should reduce corporate taxes
5		Same-sex couples should have the right to marry

ceiling and floor effects (Glynn 2013). We accomplish this by inducing negative correlation among some items so that extreme value responses are rare. For example, respondents who agree that the government should reduce taxes are unlikely to also believe that the government has eliminated corruption.¹

2.3 Differences by gender and religiosity

A growing literature examines public support for SSM around the globe, converging on a common set of factors that help explain why some people are more likely to support SSM (Adamczyk and Liao 2019). One of the most important demographic characteristics is gender. Some argue that women are more likely to support SSM because they empathize with those who experience discrimination and feel less threatened by homosexuality (Wilkinson 2006; Sherkat et al. 2011, 175). In Latin America, homosexuality is often stigmatized and seen as a sign of femininity and weakness (Carrillo 2002), and heterosexual men are also known to be particularly disapproving of homosexuality compared to women (Lancaster 1992; Parker 1999). We expect that social norms around gender in Argentina may create incentives for women to overstate and men to understate their support for SSM when they are asked directly about the issue.

¹Formal test results in SM Table B2.

Another factor to consider when thinking about subgroup effects is that, at the time of SSM legalization in Argentina, elite opinion was organized around competing issue frames. LGBT activists framed SSM as an issue of democratization and human rights; religious elites framed it as an issue of religious values and morality. Political behavior studies demonstrate that elite framing efforts significantly influence public opinion, not only moving opinion on issues but changing the ways in which people think about issues (Druckman 2001; Sniderman and Theriault 2004). Studies in the United States demonstrate that the framing of SSM has a significant effect on levels of support for its adoption (Brewer 2003b, 2003a; McCabe and Heerwig 2012). However, when elites deploy two competing frames, the success of the frames will depend on the extent to which they resonate with the public’s values (Zaller 1992, chap. 9).

We therefore expect the direction of response bias to also vary with religious identities. Catholics and Evangelicals are the most prominent religious groups. Most people in Argentina (837/1200 in our sample) identify as Catholic. However, most people who identify as Catholic do not attend religious services often, and 624/1200 of our sample identify as Catholic but are non-practicing, or attend religious services less than once a month. Evangelicals make 176/1200 of our sample and among them only about 39/1200 of the entire sample attend religious services infrequently. Atheists and other religions correspond to 152/1200 of the sample. We expect Evangelicals and practicing Catholics to be more likely to understate their support for SSM due to social pressures from their religious communities, while response bias should be modest or non-existent for non-practicing Catholics, those without a religious identity, or other religions. Below we focus on differences between Evangelicals and everyone else, while SM section D presents more detailed results by religious identity.²

²For other demographic groups, such as by age or region of residence, we have weaker expectations about how legalization may be associated with under- or over-reporting response bias. For example, we do not expect older Argentinians to feel acute social pressure to over or understate, but we may expect younger Argentinians to feel some social pressure to overstate. In the SM, we present additional results for age and residence.

2.4 Estimation

We calculate the proportion of respondents who support SSM by comparing the (unadjusted) difference in means between those who see the treatment and control lists. To determine whether individuals over or understate their support, we compare list experiment estimates with proportions calculated from responses to a direct question on support for SSM. This was presented as a 5-point scale ranging from “strongly agree” to “strongly disagree.” We code this as a binary indicator with those that strongly and somewhat agree as one, and zero otherwise.

The direct question was presented after the list experiment as part of a framing experiment. Respondents were presented with a vignette framing the competing frames described in the previous section: SSM as a human right, SSM as a violation of religious values, both, or neither. To calculate the unadjusted proportion of support for SSM from the direct question, we only use responses in the no-information control group.³ Excluding the vignettes that contain issue framing information leads to the most accurate estimate of how survey participants would respond if asked about support for SSM directly.

One limitation of list experiments is that they reduce sensitivity bias at the expense of increased variability in estimates (Blair, Coppock, and Moor 2020). This means the resulting confidence intervals are usually much wider than those of the direct question. One way to improve precision is to include covariates in the estimation of prevalence estimates (Blair and Imai 2012). We use the covariates summarized in SM Table B1 to calculate adjusted estimates of proportions for both the list experiment and direct questions. We use the variables that previous work identifies as predictors of support for SSM (Dion and Díez 2017; Adamczyk and Liao 2019; Chaux et al. 2021), including religious identity, gender, age, education, locality size, democratic values, and ideology. For the list experiment, we estimate responses to the treatment and control lists using OLS regression.⁴ For the direct questions,

³While not central to our argument, see SM Table D2 for details and results for the framing experiment.

⁴We opt for OLS regression over the preferred non-linear least squares or maximum likelihood estimators

we model binary support for SSM via logistic regression including the same covariates, plus controls for the list experiment and framing experiment conditions. We then use these models to compute predicted proportions and 95% confidence intervals.

In sum, we report four estimates of support for SSM:

1. Unadjusted direct estimate
2. Unadjusted list experiment estimate
3. Adjusted direct estimate (logistic regression)
4. Adjusted list experiment estimate (OLS regression)

This process is analogous for the estimation of sub-group effects along gender and religion, except that the estimation of adjusted proportions omits the corresponding category. SM Table C3 reports full results including all the control variables.

3 Results

Figure 2 shows the estimated proportion of respondents who support SSM under the different question types and procedures described in the preceding section. Under the direct question without any issue framing, a proportion of about 0.53 respondents indicate support for SSM (CI: [0.47, 0.58]). The unadjusted list experiment estimate suggests a proportion of 0.53 (CI: [0.41, 0.61]). Similarly, the adjusted estimates suggest similar proportions with narrower confidence intervals for the direct question (estimate: 0.56; CI: [0.52, 0.59]) and the list experiment (estimate: 0.53 , CI: [0.42, 0.65]), but we do not find enough evidence to claim that they are different from each other.

These figures may suggest that support for SSM is not a sensitive issue five years after legalization. However, they conceal differences across subgroups. Figure 3 shows estimates across sex and religion categories as specified in the previous section. Regarding respondent

discussed in Blair and Imai (2012) since they failed to produce valid prevalence estimates for subgroups with small sample sizes.

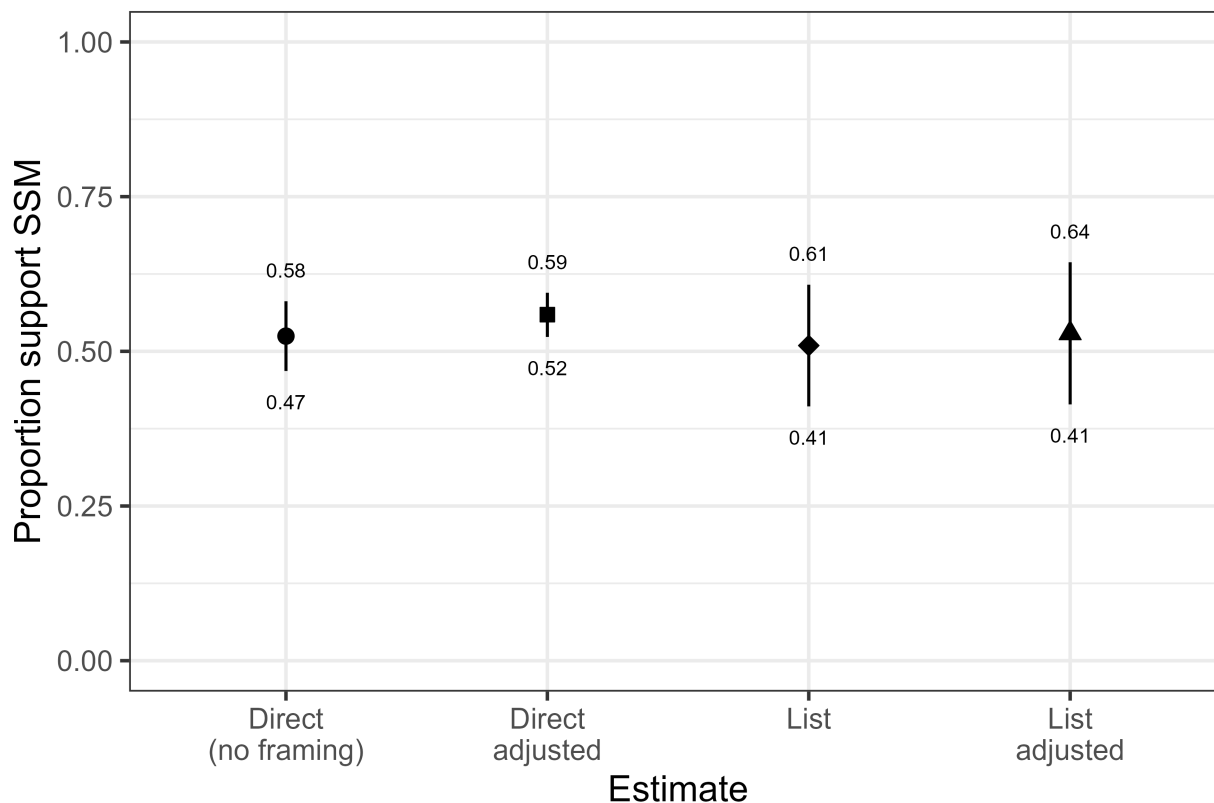


Figure 2: Estimated proportion of support for SSM under different question types and estimation procedures

Note: Vertical lines denote 95% confidence intervals. See SM Tables C1 and C2 for tabular results.

gender, the proportion of men who support SSM is 0.63 (CI: [0.58, 0.68]) under the adjusted direct question estimate. By contrast, this proportion is 0.44 (CI: [0.26, 0.61]) under the adjusted list experiment estimate. For women, these proportions are 0.49 (CI: [0.44, 0.54]) under the direct question and 0.62 (CI: [0.45, 0.78]) under the list experiment.

Regarding religion, we find that the proportion of Evangelical respondents supporting SSM is 0.26 (CI: [0.19, 0.35]) under the adjusted direct question estimate. The adjusted list experiment estimate is 0.68 (CI: [0.28, 1.08]), although note that confidence intervals are wide and exceed the plausible upper bound. In contrast, and contrary to expectations, we find that among non-Evangelicals the adjusted direct question probability of supporting SSM is 0.62 (CI: [0.58, 0.65]), compared to the adjusted list experiment estimate of 0.51

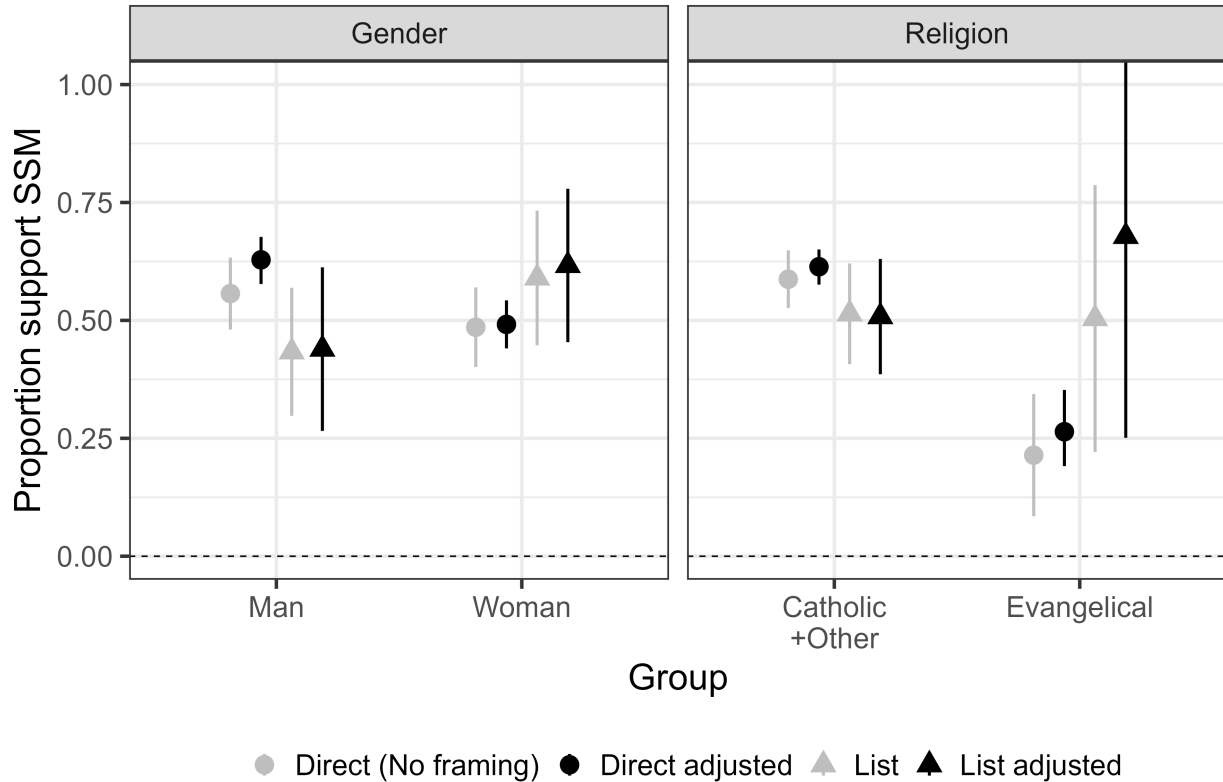


Figure 3: Estimated proportion of support for SSM by respondent gender and religion

Note: Vertical lines denote 95% confidence intervals.

(CI: [0.39, 0.64]). In SM Figure D1, we further divide groups into non-practicing Catholics (those not attending church often), practicing Catholics, and others (non-believers and other religions). We find that all groups tend to overstate their support for SMM, although non-practicing Catholics and others show, in average, higher baseline support. As a whole, these figures provide suggestive evidence for the diverging social pressures that underlie SSM preferences across religious groups.⁵

While the point estimates in these subgroup analyses suggest two-sided sensitivity, the overlapping confidence intervals indicate that our list experiment may not have enough statistical power to detect this heterogeneity across groups. This is supported by SM Table D1, re-

⁵See also SM Figure D1 and Table D1 for subgroup analyses along age and region of residence, for which we do not find any meaningful patterns of two-sided sensitivity.

porting bootstrapped confidence intervals for the difference between direct adjusted and list adjusted estimates within each subgroup and showing little evidence against indistinguishable estimates. We only find evidence for non-zero differences among men and evangelicals, although the confidence intervals for these differences are still wide.

4 Conclusion

Researchers may have reason to expect survey respondents to either *over* or *understate* their support for a policy, particularly when attitudes are highly polarized in well-understood ways and a policy change may create new dynamics of social desirability. In our case study, we show that aggregate summary list experiment estimates may obscure two-sided sensitivity bias across subgroups. However, like most research using list experiments or other indirect questioning techniques to minimize sensitivity bias, our study was not designed to directly capture these quantities of interest. In this regard, we expand previous work calling attention to the tradeoffs that researchers must navigate while implementing indirect questioning techniques to mitigate sensitivity bias (Blair, Coppock, and Moor 2020).

If researchers are interested in minimizing misreporting under two-sided sensitivity, they should design studies that capture this heterogeneity deliberately. The first step is to plan for a sufficient sample size to ensure adequate statistical power for subgroup analyses. This may imply not only surveying a larger sample than the usual list experiment, but also oversampling key hard-to-reach population groups.

The second step is to devise an appropriate estimation strategy to capture heterogeneity across groups. This depends on how much is known in advance. If previous literature agrees on the determinants of support or opposition toward a sensitive issue, as it is the case for SSM, one can block-randomize across these groups and modify the wording of the sensitive item. For example, in the case of support for SSM this would imply asking whether same-sex couples should have the right to marry among women and whether they should *not*

have this right among men. Alternatively, if the determinants of two-sided sensitivity are not known in advance, one could implement machine learning algorithms to detect heterogeneous treatment effects after conducting a survey (Wager and Athey 2018).

Publishing Statements and Declarations

Funding

This research was funded by the McMaster Arts Research Board, and approved by the McMaster University Research Ethics Board (#2015 020).

Competing interests

The authors declare none.

Data availability

Data and reproduction materials will be made available at the PSRM dataverse prior to publication.

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