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Gun-shy: Refusal to answer questions about firearm ownership☆

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ABSTRACT

In recent years, surveys in the United States have faced increasing refusal to answer questions about firearm ownership, even as other similar questions see no comparable up-tick in item nonresponse. Asymmetrical polarization, elite messaging, and changing media institutions all suggest that the surging nonresponse concerning gun-ownership questions may be increasingly concentrated among those with rightward political and partisan leanings, potentially skewing inferences about gun-related issues. Data from the General Social Survey confirms that the increase in probability of declining to answer firearm-ownership questions is particularly stark among those identifying as Republicans, particularly those with a conservative outlook skeptical of government.
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1. Introduction

Firearms pack an emotional charge strong enough that some survey respondents refuse to discuss them (Mauser & Kopel, 1992; Wallace, 2017). The resulting lack of information contributes to factors limiting scholarly and policy research relating to guns (Bachynski, 2017), and the murkiness around the issue is further complicated by survey respondents' seeming sensitivity to extraneous factors when deciding whether or not to answer relevant questions (Wells, Cavanaugh, Bouffard, & Nobles, 2012).

The reluctance to reveal gun (non-)ownership seems to be spreading, even in consistent survey contexts. The General Social Survey (GSS), for example, has long asked "Do you happen to have in your home or garage any guns or revolvers?"[1] Fig. 1 shows percentages of respondents who refused to answer[2] in each survey year; the solid line shows a smoothed (Loess) trend of these points. For comparison, the figure's short-dashed line shows analogous trends for refusals to answer a home-ownership question, while the long-dashed line shows refusals to answer a question about access to a phone.

Until roughly 2000, the gun-ownership question refusal rate hovered around one percent. After that, however, it roughly tripled; even the lowest refusal rate after 2008 (2012's 1.83%) exceeds the highest refusal pre-2004 rate (1988's 1.74%). A fractional-logistic model using year to predict nonresponse confirms an upward trend (two-

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[1] This question produces different overall estimates of gun prevalence than do some others (Legault, 2013), but for assessing changing response patterns *internal* consistency matters most.

[2] "Refused to answer" here excludes those who respond "Don't know," as these respondents may be expressing genuine uncertainty about whether a co-householder has guns. The processes that generate "Don't know" responses, in any event, typically differ from those leading to refusal to answer questions (Riphahn & Serfling, 2005; Shoemaker, Eichholz, & Skewes, 2002).

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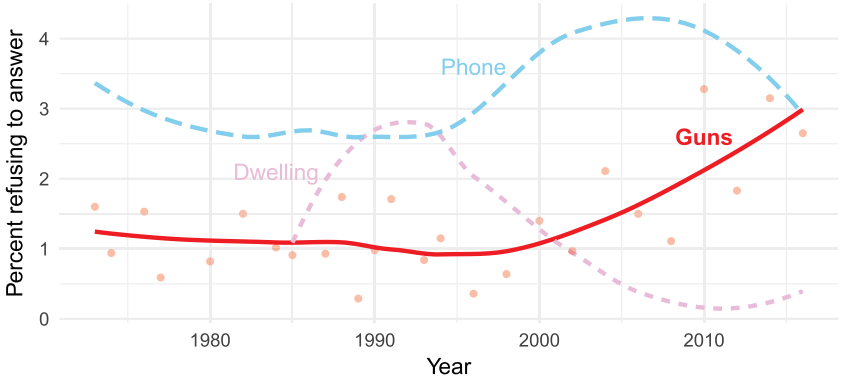

Fig. 1. Refusals to answer General Social Survey questions about ownership.

tailed $p < 0.001$). Notably, this rise antedated the Obama administration. Refusal rates outpaced previous long-term averages in 2004 and 2006, with 2004's rate higher than any previous year's. While Obama's election may have increased reticence about gun ownership (Depetris-Chauvin, 2015), any such effect seemingly built on already gathering trends. Nor is this just greater paranoia about revealing ownership information in the Big Data era: queries about home- and phone-ownership lack the same trend.

Understanding who refuses to answer gun-ownership questions grows more important as refusals become more common. This article explores one potential population who may have become more taciturn about its gun-ownership status: Republicans, who because of increasingly polarized attitudes and particular messaging by the party's elites might be expected to worry more about survey-taker judgments or future governmental firearm-confiscation programs. Regressions estimated on the GSS gun-ownership data used in Fig. 1 suggest that the surge of refusal to answer in this case has concentrated especially among Republicans.

2. Survey question refusal and guns

It has long been known that survey respondents' decisions to opt out of answering certain questions are not random and might therefore bias inferences when not accounted for. Indeed, scholars have developed various methodologies specifically to try to address problems of "item nonresponse," as it is known (Bertoli-Barsotti & Punzo, 2014; Copas & Li, 1997; Johanson, Gips, & Rich, 1993). Naturally, the simplest solution would be preventing the nonresponse from happening in the first place; understanding how to achieve this has motivated a broad literature into what motivates such respondent behavior (de Leeuw, Hox, & Huisman, 2003).

Questions that concern taboo topics prompt notably high rates of nonresponse. This can be because the subjects involved are considered embarrassing, as with questions relating to sexuality (Fredriksen-Goldsen & Kim, 2015; Tu & Liao, 2007) or medical conditions (Herzog, Fultz, Brock, Brown, & Diokno, 1988). In other cases, most notably with income, social norms make a topic uncomfortable for polite company, which may induce reluctance to respond even among respondents for whom the question's answer is not particularly embarrassing (Bell, 1984; Riphahn & Serfling, 2005). This importance of social norms to nonresponse is a subset of the wider problem of social-desirability bias in survey research (McDonald, Scott, & Hanmer, 2017; Powell 2013), where the fear of being judged leads respondents to modify their answers. In the case of nonresponse, this sort of desirability bias can occur when respondents want to veil answers that they suspect the survey takers will dislike, but do not want to actively state something false or misleading.[3] Because this behavior hinges on opinions about the survey takers, it might be expected to vary according to interviewer characteristics, and this indeed proves to be the case: interviewers' and respondents' attributes interact to encourage or discourage item nonresponse (Vercruyssen, Wuyts, & Loosveldt, 2017; Yang & Yu, 2008).

These forces may speak directly to questions about firearms. Gun owners, for example, could be stigmatized – or perceive themselves to be stigmatized – and therefore be reluctant to answer questions that might identify them (Kleck, Gertz, & Bratton, 2009). Firearms might, additionally, be owned illicitly, which both furthers the potential for stigma and may lead to fears of legal consequences if the ownership became generally known (Kellermann, Rivara, Banton, Reay, & Fligner, 1990). The threat of post-survey consequences, that is, can motivate nonresponse, as has been observed in revelation of other risky personal information (Kim et al., 2015). The question then becomes: who is likeliest to feel such a sense of stigma, threat, or other psychological impetus to choose not to answer questions about guns, and why has this reaction been rising in the way suggested by Fig. 1?

One possible such mechanism is asymmetric polarization. In recent years, America's main parties have diverged in internal organization and ideological centrism, with Republicans committing particularly strongly to ideological and institutional principles favoring individual autonomy, even in self-defense, that might lead to wari-

[3] Respondents' being willing to fabricate an unreliable answer may have different antecedents than does merely refusing to answer a question (Blasius & Thiessen, 2015).

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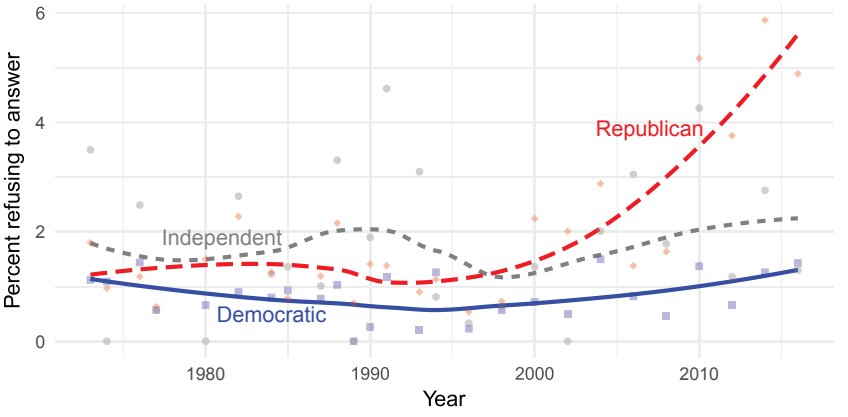

Fig. 2. Refusals to answer General Social Survey questions about gun ownership, by political party. Squares show refusals among Democrats, circles among independents, and diamonds among Republicans.

ness about revealing sensitive information to survey-takers (Grossmann & Hopkins, 2015; Shufeldt, 2018). Partisan elites reinforce greater Republican wariness by increasingly favoring hostile, low-trust strategies (Russell, 2018); an emergent right-wing news ecosystem (Hopkins & Ladd, 2014) does the same, stressing firearms ownership's link to Republican identity and sounding alarms about government gun confiscation (Joslyn, Haider-Markel, Baggs, & Bilbo, 2017). All of this is especially apt to persuade Republicans, in light of their typically greater responsiveness to informational cues (Lau, Andersen, Ditonto, Kleinberg, & Redlawsk, 2017). Both social institutions and broad movements in attitudes might then prompt asymmetric unwillingness to reveal gun-ownership status, with particular caginess on gun-related questions from Republicans — and in ways that have increased in recent years as partisan and media alignments have changed.

Indeed, a preliminary examination shows some support for the idea that Republicans are particularly important contributors to the trend observed in Fig. 1. Fig. 2 decomposes the gun-ownership nonresponse rate by political identification of respondent.[4] As the figure shows, rates of declining to reveal whether or not a gun-owner lived in the household ticked up over the most recent two decades for all three partisan groupings. But the surge was largest and most consistent among survey respondents who self-identified as Republicans.

Naturally, a simple bivariate relationship like that in Fig. 2 can only be suggestive. More formal tests require accounting for other factors that might correlate with divergent partisan attitudes over time. The next sections turn to essaying such tests.

3. Data and analysis

Fig. 1's General Social Survey data on nonresponse can also more formally test the hypothesis that nonresponse to gun questions concentrates among recent Republicans. In reported results, year-of-survey (recentered so that the year 2000 is coded as 0) and its square[5] are interacted with partisanship assessed by responses to "Generally speaking, do you usually think of yourself as a Republican, Democrat, Independent, or what?" This question's answers are coded from 0 (Strong Democrat) through 6 (Strong Republican), with those identifying with a minor party coded as not leaning towards either major party; excluding such respondents from the analysis produces similar conclusions. The interaction between these partisan values and year allows examination of whether willingness to answer has diverged by party over time.

One key control variable is gun-policy attitudes, which are highly partisan in the United States and likely shape gregariousness on firearms issues. The General Social Survey's relevant question is "Would you favor or oppose a law which would require a person to obtain a police permit before he or she could buy a gun?"; possible answers are "favor" (coded low) or "oppose" (coded high). Strikingly, nonresponse to this question has been under 0.25% and not increasing.

Several demographic features connect to gun-related behaviors and attitudes: American gun culture is gendered (Goss, 2017), generational (Gabor, 2016), and racialized (Filindra & Kaplan, 2016). Firearm attitudes also reflect class (Pruitt, 2010) and geography, with regional differences (Ellison, 1991) and an urban–rural divide (Wolpert & Gimpel, 1998). As these forces also shape partisan identity, they serve as important control variables here. Hence, regressions include self-reported sex, age (in years, and its square), and race (White, Black, or other). Indicators of socioeconomic status include how many children the respondent has had, subjective social class on a four-point scale from lower-class (coded low) through upper-class,

[4] Figure 2 includes "partisan leaners," those who profess to be independents but lean towards a particular party, as members of that party rather than as independents: most research suggests that leaners in fact generally are more like partisans than like true independents (Theodoridis, 2017; Valentine & Van Wingen 1980). Coding leaners as independents instead preserves the basic results of Fig. 2, although the larger number of observations categorized as independents mean that independents appear less volatile.

[5] Reported conclusions persist using other functional forms for time (e.g., decade fixed effects).

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Table 1
Multilevel logistic models of refusal to answer GSS gun-ownership questions, 1973–2016. Standard errors, clustered by year, in parentheses. * indicates (two-tailed) $p < 0.05$.

	1	2	3	4
Party identification	0.099* (0.036)	0.012 (0.047)	0.021 (0.053)	0.006 (0.048)
Year	0.017 (0.009)	0.017 (0.011)	0.018 (0.010)	0.015 (0.012)
Year^2 ($\times$100)	0.104 (0.069)	−0.026 (0.099)	−0.027 (0.112)	−0.054 (0.103)
Party identification $\times$ Year	0.006* (0.001)	0.006* (0.002)	0.006* (0.002)	0.006* (0.002)
Party identification $\times$ Year^2 ($\times$100)	0.016 (0.011)	0.053* (0.017)	0.050* (0.019)	0.054* (0.018)
Opposes requiring permits for guns	1.085* (0.091)	1.020* (0.135)	0.972* (0.152)	1.032* (0.147)
Female	−0.232* (0.104)	−0.179 (0.132)	−0.145 (0.140)	−0.153 (0.148)
Age	0.108* (0.018)	0.101* (0.022)	0.098* (0.022)	0.108* (0.022)
Age^2 ($\times$100)	−0.082* (0.017)	−0.075* (0.021)	−0.072* (0.021)	−0.081* (0.021)
Black	0.250 (0.152)	0.230 (0.232)	0.188 (0.220)	0.129 (0.231)
Other nonwhite	0.014 (0.305)	0.283 (0.337)	0.233 (0.335)	0.003 (0.350)
Number of children	−0.011 (0.030)	−0.001 (0.040)	−0.015 (0.042)	−0.020 (0.044)
Subjective social-class identification	−0.238* (0.075)	−0.349* (0.080)	−0.295* (0.080)	−0.315* (0.080)
Years of education	0.064* (0.020)	0.022 (0.030)	0.007 (0.032)	0.014 (0.025)
Ln(town size in 1,000s)	−0.029 (0.025)	0.013 (0.038)	0.015 (0.045)	0.029 (0.037)
Born outside United States		−1.201* (0.367)	−1.343* (0.362)	−1.206* (0.395)
Income		0.114* (0.037)	0.125* (0.044)	0.119* (0.042)
Racially homogeneous neighborhood			−0.024 (0.151)	
Frequency of church attendance				0.003 (0.023)
Fundamentalism				0.038 (0.089)
Census-division fixed effects	Yes	Yes	Yes	Yes
N	36,036	29,269	27,794	27,993

and years of education. Models capture geographic context with the logarithm of (one plus) respondent's community population size in thousands and Census-division fixed effects.

Some variables of interest have high nonresponse or were not asked in all survey years. These are accordingly only included in some models, as robustness tests; excluding respondents who decline to answer other sensitive questions additionally checks whether results hinge on general reserve rather than gun-specific attitudes. Such variables include family income[6] on a twelve-point scale and whether the respondent was born in the United States. Additionally, feelings of threat may, particularly among Republicans, tie to the presence of visible minorities (Dyck & Pearson-Merkowitz, 2014), so one alternative model includes an indicator of whether the respondent has any neighbors of another race. Guns also link to religious attitudes (Stroope & Tom, 2017), so one model includes a measure of frequency of religious-service attendance on a nine-point scale as well as self-reported religious fundamentalism on a three-point scale.

Table 1 reports the resulting models, using multilevel logistic regression to account for the yes–no dependent variable and the nesting of individual respondents by survey year.[7] The interaction of partisan identification and year consistently has a positive, statistically significant coefficient: as time has gone on, more-Republican respondents have been especially likely to decline to answer the gun-ownership question. Furthermore, in most models the interaction of partisanship with the square of year also take a positive and statistically significant coefficient, suggesting that the partisan divergence in unwillingness to answer has been accelerating.

Substantively interpreting logistic-regression coefficients is challenging, especially in Table 1, with models featuring both interactions and quadratic terms. To make the results more intuitive, Fig. 3 graphs each model's predictions for respondents at mean values of control variables. Solid lines show predictions for Strong Democrats; dotted lines, those for Strong Republicans. Predictions for other partisan groups, naturally, fall between these two extremes. Each Fig. 3 panel also displays 95% confidence intervals for the predicted values. The figure affirms the sense of recently increasing nonresponse — and shows the recent increase in gun-ownership nonresponse to be heavily concentrated among the most Republican respondents.

The results for control variables are also plausible. Older respondents are more likely to refuse to answer the gun-ownership question — just as they are more likely to decline to answer questions on most other topics (Elliott, Edwards, Angeles, Hambarsoomians, & Hays, 2005; Kim et al., 2015; Turrell, 2000). The tendency for those of higher social classes to be more likely to answer questions similarly parallels findings of other studies (e.g., Kupek, 1999), although correlations between income, education, race, and class may temper the confidence of specific inferences about class (Cohen, Shin, Liu, Ondish, & Kraus, 2017). Immigrants being, as here, more likely to answer is somewhat less common; immigrants often, if only because of language difficulties, forbear to answer survey questions, though sometimes feelings of civic engagement do motivate lower nonresponse rates among immigrants (Couper & de Leeuw, 2003). Other variables do not appear to be consistent predictors of gun-question nonresponse in the GSS.

[6] The income question does not adjust for inflation. Instead using income percentile among the year's survey respondents does not substantially change results for partisanship–year interaction.

[7] Using a conventional, single-level logistic model with clustered standard errors produces similar results, albeit with generally smaller standard errors on the coefficients of interest.

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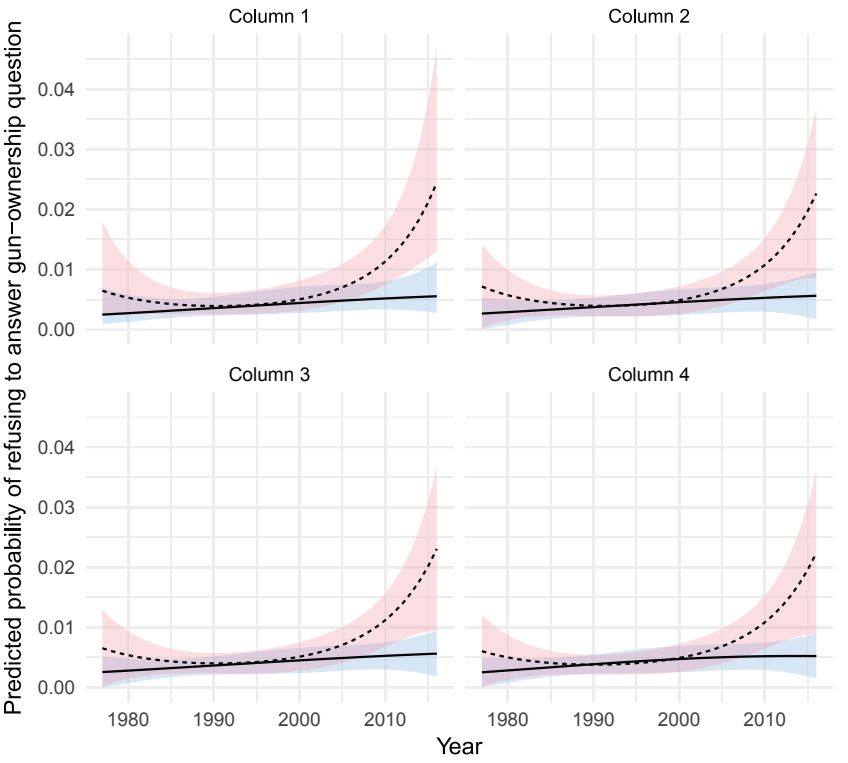

Fig. 3. Predicted outcomes according to Table 1's models, with control variables held at their means, for Strong Republicans (dotted line) and Strong Democrats (solid line). Shaded areas indicate 95% confidence intervals.

Table 2
Multilevel logistic models of refusal to answer GSS gun-ownership questions, 1973–2016. Standard errors, clustered by year, in parentheses. * indicates (two-tailed) $p < 0.05$.

	5	6	7	8
Party identification	0.163* (0.055)	0.050 (0.040)	0.139* (0.053)	0.096* (0.035)
Year	0.014 (0.021)	0.023* (0.009)	0.012 (0.019)	0.016 (0.009)
Year^2 (×100)	0.164 (0.111)	0.103 (0.076)	0.160 (0.100)	0.114 (0.069)
Party identification × Year	0.003 (0.004)	0.004* (0.001)	0.005 (0.003)	0.006* (0.001)
Party identification × Year^2 (×100)	−0.015 (0.023)	0.011 (0.015)	0.008 (0.019)	0.018 (0.011)
Opposes requiring permits for guns	1.179* (0.132)	1.076* (0.094)	1.093* (0.126)	1.076* (0.090)
Female	−0.188 (0.135)	−0.230* (0.110)	−0.164 (0.144)	−0.219* (0.102)
Age	0.120* (0.027)	0.108* (0.018)	0.128* (0.025)	0.109* (0.018)
Age^2 (×100)	−0.097* (0.025)	−0.085* (0.018)	−0.100* (0.022)	−0.083* (0.017)
Black	0.162 (0.225)	0.218 (0.145)	0.281 (0.221)	0.175 (0.157)
Other nonwhite	−0.152 (0.520)	−0.172 (0.331)	−0.081 (0.415)	−0.024 (0.307)
Number of children	0.008 (0.041)	−0.002 (0.032)	0.000 (0.037)	−0.007 (0.029)
Subjective social-class identification	−0.232 (0.121)	−0.192* (0.078)	−0.315* (0.126)	−0.233* (0.074)
Years of education	0.070* (0.028)	0.063* (0.022)	0.058 (0.031)	0.073* (0.020)
Ln(town size in 1,000s)	−0.044 (0.039)	−0.019 (0.029)	−0.091* (0.034)	−0.030 (0.026)
Confidence in federal government	−0.290* (0.056)			
Left-right ideology		0.184* (0.035)		
Interpersonal trust			−0.161 (0.136)	
Interviewer-rated uncooperativeness				0.570* (0.059)
Census-division fixed effects	Yes	Yes	Yes	Yes
N	21,195	33,893	19,204	35,766

4. Causal mechanisms

An obvious follow-on question is what stimulates Republicans' newfound reluctance to answer questions about gun ownership. Do the results here showing responses to overwrought coverage in partisan media, to messages from partisan elected officials that one should be circumspect about guns, or to something else? These factors undoubtedly interrelate – e.g., partisan elected officials influence, and are influenced by, the views of the mass public – but establishing which mechanisms observably related to nonresponse would be of interest. Unfortunately, the dataset used here is ill-suited for shedding light on that issue.

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For example, the General Social Survey is hard-pressed to trace the effect of exposure to partisan news media. The GSS does ask how many hours per day respondents watch television, but daily television exposure is a very noisy measure of exposure to television news, let alone news with a partisan valence.[8] Conversely, questions about television ignore exposure to talk radio and Internet news, major partisan media in the United States. Radio exposure was only queried in 1978, 1982, and 1983, and Internet exposure inconsistently asked about since first appearing in the GSS in 2000 (when asked in 2016 when they started using the Internet, 44% of respondents gave a date before 2000, suggesting that many respondents had unobserved Internet news exposure for several years). Print media, for which GSS does not measure consumption in hours, further complicates the matter, as does the GSS's split-ballot design typically giving media-related information for only half of those asked gun-ownership questions. Tests of other potential stimuli that might be inducing the changed nonresponse behavior are similarly elusive.

Despite this limit on isolating the effect of particular external influences, the GSS can provide circumstantial evidence about the attitudinal characteristics of those who refuse to answer gun-related questions. The theories above imply that nonresponse to gun-ownership questions should correlate with various other elements of personal outlook. For example, to the extent that fears that government will attempt to seize weapons motivates unwillingness to respond, confidence in the federal government may relate to nonresponse. Here, that confidence is operationalized as the sum of confidence in the federal executive, in Congress, and in the Supreme Court, each of which is measured on a three-point scale. As an alternative, related measure, self-declared ideology on a seven-point left-right scale is more broadly available while still in large part reflecting attitudes towards interventionist government policy.

Alternatively, the discussion above could implicate political ideology less than optimistic assessments of other Americans. Asymmetrical partisan rancor may spill into lessened trust of other people more generally (although low trust does not always predict nonresponse on sensitive survey questions: Kim et al., 2015); the GSS measures general interpersonal trust on a three-point scale. Such suspicion could be targeted more narrowly at the survey-taker, attitudes towards whom are reported by the GSS on a four-point scale from "friendly, interested" (coded low) to "hostile" (coded high).

Table 2 adds each of these potential control variables, in turn, to the baseline (Column 1) model of Table 1. The additional variables are of interest both in whether they directly affect respondents' willingness to answer questions about guns and in how they mediate Table 1's effects of recent Republicanism on nonresponse patterns.

All of the additional variables except for interpersonal trust have a statistically significant relationship with refusal to answer the gun-ownership question: as expected, those less confident in the federal government, on the political right, and generally balky about the interview proved most likely to refuse to reveal whether anyone in their households owned a gun. In some cases, these effects correlate closely enough with those of Republican to appreciably reduce the effect of the independent variables of interest – particularly in the first column, where the variable assessing confidence in government drains magnitude and statistical significance from the effect of being a latter-day Republican.[9] Conversely, general uncooperativeness with the interview has very little effect on the coefficients regarding being a Republican: ideological beliefs seem to matter more than general curtness for the effect considered here.

5. Conclusion

Over-time declines in response to gun-related questions are notable because they occur as the pace of gun-related measures enacted, especially at state and local levels, a rising salience that in most realms of policy associates with more, not fewer, people responding to questions (Groves, Presser, & Dipko 2004). Moreover, increased nonresponse concentrates among Republicans. This comports with the idea that asymmetrically polarizing forces contribute to survey nonresponse behavior. It also echoes other findings that perceptions of comfort or threat affect respondents' willingness to respond to survey questions (e.g., Pérez, 2016).

The results raise questions for future research about what other issues might see growing ideological biases in nonresponse, or whether question wordings and contexts other than those of the GSS see similar patterns. Future research can also trace social processes that have increasingly linked Republican partisanship to concern about answering gun-related questions. nonresponse. Surveys that measure exposure to elite messages (such as direct mailers from political campaigns), to news sources that invoke potential threats from revealing gun-ownership status (talk radio, Fox News), and to messages received through personal and social-media networks (Blee & Creasap, 2010) could shed further light on how social networks, party-leadership cues, and media institutions shape reluctance to respond to gun-ownership questions.

Regardless of the mechanism, however, these findings suggest that ignoring nonresponse on gun-ownership questions may lead to increasingly biased results. A naïve analysis omitting respondents who refuse to answer gun-ownership questions may result in a sample that is less Republican and more pro-gun-control than is the general population. Understanding gun politics among the American public requires responses, such as multiple imputation or list-experiment survey design, that surmount this growing hurdle to clear information.

[8] When, in 2000, the GSS as a one-off asked how often respondents sought political information via television, the correlation with the number of hours of television watched was less than 0.03.

[9] In regressions without the quadratic terms, Party identification × year consistently attains statistical significance, though the confidence-in-government variable shrinks the effect size.

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