

# Ideological Asymmetries and the Determinants of Politically Motivated Reasoning

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## Abstract

A large literature demonstrates that conservatives have greater needs for certainty than liberals. This suggests an asymmetry hypothesis: conservatives are less open to new information that conflicts with their political identity and, in turn, political accountability will be lower on the right than the left. However, recent work suggests that liberals and conservatives are equally prone to politically motivated reasoning (PMR). The present paper confronts this puzzle. First, we identify significant limitations of extant studies evaluating the asymmetry hypothesis and deploy two national survey experiments to address them. Second, we provide the first direct test of the key theoretical claim underpinning the asymmetry hypothesis: epistemic needs for certainty promote PMR. We find little evidence for the asymmetry hypothesis. Importantly, however, we also find no evidence that epistemic needs promote PMR. That is, while conservatives report greater needs for certainty than liberals, these needs are not a major source of political bias.

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# Introduction

In the “folk theory” of democracy, citizens monitor and hold their elected representatives accountable for their actions. In turn, the latter reflect, if only imperfectly, the will of the people (Achen and Bartels, 2016). Voting models consistent with the folk theory vary greatly in what they require of citizens (Campbell et al., 1960; Downs, 1957; Fiorina, 1981; Lau and Redlawsk, 2001; Key, 1966), yet all share the assumption that people are responsive to new information. As Achen and Bartels (2016, pg. 295) put it, “Democratic competence requires not only logical consistency and cognitive efficiency, but also some modicum of accuracy in perception and receptiveness to new and, perhaps, disconfirming evidence.”

One of the most compelling challenges to the folk theory thus comes from the literature on politically motivated reasoning (hereafter PMR), defined as the biased evaluation and assimilation of new information based on its consistency with the values and policies of the political in-group (Kahan, 2015b). A growing body of research suggests that political learning is biased by prior attitudes and partisan proclivities (Achen and Bartels, 2016; Flynn et al., 2017; Kahan, 2015a; Leeper and Slothuus, 2014; Lodge and Taber, 2013). Citizens seek out evidence that confirms their pre-existing beliefs and preferences (Iyengar and Hahn, 2009; Taber and Lodge, 2006), use different inferential standards in assessing politically congenial and uncongenial information (Johnston and Ballard, 2016; Kahan et al., 2017; Khanna and Sood, 2018), attribute responsibility for positive and negative events to liked and disliked actors (Bisgaard, 2019), and selectively down-weight disconfirming information when updating prior beliefs (Hill, 2017). Taken together, this literature makes a strong case that the primary, citizen-level, factors limiting democratic responsiveness are *motivational* rather than *informational* (Achen and Bartels, 2016; Jost et al., 2013; Lavine et al., 2012).

A critical question thus concerns the root causes of PMR. What is it specifically that motivates biased belief updating in the political realm and what factors facilitate such bias? To date, scholars have identified several variables—both contextual (e.g., Bullock et al., 2013; Druckman et al., 2013; Khanna and Sood, 2018) and individual (e.g., Arceneaux and

Vander Wielen, 2017; Kahan et al., 2017; Lavine et al., 2012)—that shape citizens’ willingness to sacrifice political self-affirmation for accuracy. Perhaps the most controversial claim, however, is that PMR varies as a function of political orientation, with conservatives and Republicans less willing to update in response to uncongenial information than liberals and Democrats (Baron and Jost, 2019; Jost et al., 2018; Morisi et al., 2019). We refer to this as the *asymmetry hypothesis*, which is rooted in decades of research demonstrating that right-wing citizens score higher than left-wing citizens on measures of epistemic needs for certainty and related traits, such as dogmatism and intolerance of ambiguity (Federico and Malka, 2018; Jost, 2017; Jost et al., 2003). If true, the asymmetry hypothesis has important implications for American politics, because it suggests that conservative and Republican elites are less constrained by the public than liberals and Democrats, which could “tilt the playing field disproportionately in favor of conservatives and against liberals” (Morisi et al., 2019).

However, while comprehensive meta-analyses find strong support for an asymmetry in domain-general needs for certainty (Jost et al., 2003; Jost, 2017), recent empirical work suggests that left- and right-leaning citizens are equally prone to PMR (Ditto et al., 2019; Kahan, 2013). In a meta-analysis of 51 studies, Ditto and colleagues find no average differences across citizens of the left and right in the tendency to differentially evaluate politically congenial and uncongenial information.<sup>1</sup> Thus, there is an unresolved conflict in the literature: while there is a robust association between general epistemic needs and right-wing political orientation, it seems that right-wing citizens are no more politically biased than their left-wing counterparts.

The aim of the present paper is to make sense of this puzzle. We begin by reexamining the 51 studies included in Ditto et al.’s (2019) meta-analysis. While this study appears to conclusively reject the asymmetry hypothesis, we find that less than half of the included studies meet current standards for distinguishing PMR from normatively defensible forms of

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<sup>1</sup>See Baron and Jost (2019) for a critique of this study and Ditto et al. (2019) for a rejoinder.

belief updating (Kahan, 2015b). Moreover, only a small set of these studies use representative samples and examine divisive issues for which PMR is most likely. Consequently, we argue there is insufficient empirical work to decisively reject the asymmetry hypothesis. In turn, we designed a large experimental test of this hypothesis. Across two studies, featuring three distinct measures of PMR, five salient political issues, and three operationalizations of citizens' left-right orientation, we find that liberals and conservatives engage about equally in PMR.

Thus, there remains a conflict between the literature on ideological differences in epistemic needs and that on asymmetries in political bias. To help resolve this puzzle, we provide a direct test of the relationship between individual differences in epistemic needs and PMR. Using multiple measures of needs for certainty, we find little evidence that they increase political bias. Our results thus dissolve the conflict between these two literatures: while right-wing citizens score higher in needs for certainty, these needs appear to have no meaningful influence on PMR (Eichmeier and Stenhouse, 2019). Finally, if epistemic needs play little role in PMR—and bias is symmetric across political orientation—what individual differences *do* motivate political bias? We directly test the most prominent alternative theory in the literature: that PMR arises from individual differences in the centrality of politics to the self-concept. Surprisingly, we find only mixed support for this claim.

Our results have important implications for American politics. While we cannot speak to all possible mechanisms of PMR—biases in information-*seeking*, for example—we do reject asymmetries in the evaluation of new evidence in the updating of policy-relevant factual beliefs, which is critical to day-to-day politics. To be clear, our results are not necessarily good news for democratic accountability, as they converge with the existing literature documenting substantial partisan and ideological biases in the updating of beliefs. But we observe no *differences* in such biases across ideological groups. This work also has implications for the broader literature on PMR. We find little evidence for two of the most prominent theories of its deeper motivational origins—that PMR arises from epistemic needs for certainty and

political identity centrality. We conclude with a discussion of alternative theories focused on ability rather than motivation, as well as directions for future research.

## Epistemic Needs and Asymmetries in Politically Motivated Reasoning

At the heart of the asymmetry hypothesis is empirical evidence that right-wing citizens have greater needs for certainty than left-wing citizens (Jost et al., 2003; Jost, 2017). For example, the former score higher in the “need for closure” (hereafter NFC), which Kruglanski (1989, pg. 14) defines as “the desire for a definite answer on some topic, any answer as opposed to confusion and ambiguity. Such need thus represents a quest for assured knowledge that affords predictability and a base for action.” As Kruglanski and Webster (1996) explain, NFC is associated with both an *urgency* tendency and a *permanence* tendency: early decision foreclosure under conditions of uncertainty combined with resistance to information that challenges preexisting opinions. Similarly robust associations exist between right-wing attitudes and other traits related to uncertainty aversion, such as dogmatism, cognitive rigidity, and intolerance of ambiguity (Jost, 2017).

In contrast, left-wing citizens score higher on variables tapping a generalized ‘openness,’ such as openness to experience of Big Five personality theory and openness to change of Schwartz value theory (Carney et al., 2008; McCrae, 1996; Gerber et al., 2010; Johnston et al., 2017; Malka et al., 2014; Mondak, 2010). Open individuals tend to be independent, curious, intellectual, and attracted to complexity and novelty, suggesting, in the words of Bertrand Russell (1950, pg. 15, as cited in Jost 2017, 169), that “The essence of the liberal outlook lies not in *what* opinions are held, but in *how* they are held: instead of being held dogmatically, they are held tentatively, and with a consciousness that new evidence may at any moment lead to their abandonment.”

In turn, both academic (e.g., Baron and Jost, 2019; Jost, 2017) and popular (Mooney,

2012) work has argued that PMR should be more prevalent on the right than the left, because conservative individuals are particularly averse to the uncertainty and instability inherent in reconsidering one’s political views. Surprisingly, then, a recent meta-analysis of 51 studies finds no evidence for average differences in PMR across ideology (Ditto et al., 2019). However, this conclusion is disputed by Baron and Jost (2019), who argue that very few of the included studies allow for a valid test of the asymmetry hypothesis. They raise two primary objections.

They argue first that because the included studies were not explicitly designed to test the asymmetry hypothesis, the treatment materials were unrepresentative of salient and divisive political issues where ideological asymmetries would be expected. As the authors put it, “It seems clear that the original researchers made no effort to sample issues so that they would be representative of the topics of political debates at the time of the study. Thus, the issues chosen for study in the first place were unlikely to produce evidence of asymmetrical ideological bias, even if it does exist” (Baron and Jost, 2019, pg. 295). Theoretically, PMR is more likely on divisive issues because citizens are more likely to hold strong prior attitudes where partisan conflict is more intense (Druckman et al., 2013; Johnston and Ballard, 2016; Slothuus and De Vreese, 2010). Using low salience issues thus risks underestimating ideological asymmetries because there is reduced incentive to process information in a biased manner.

Baron and Jost (2019) further argue that few of the studies are capable of distinguishing motivated reasoning from rational belief updating. This could create the appearance of symmetry in political bias if left-wing citizens are more justified in their belief stability, on average, than right-wing citizens. Indeed, ‘resistance’ to new information need not imply political bias, because it is often consistent with the moderating influence of prior beliefs. For example, people often have defensible reasons to distrust the source of new information or the methodology used to generate evidence for a claim. Further, citizens often have strong prior beliefs rooted in previous learning about an issue. In such cases, new evidence will have

only a small *marginal* impact that may be difficult to detect with coarse survey measures. In turn, “the true source of the alleged bias may be purely cognitive, with no motivation involved—that is, purely a case of beliefs affecting beliefs rather than desires affecting beliefs” (Baron and Jost, 2019, pg. 296).

Consequently, studies examining differences in ‘posterior’ beliefs following exposure to new information produce ambiguous evidence for motivated reasoning. Distinguishing PMR from other explanations thus requires a direct examination of the way citizens *process* new information, and a demonstration that they are “adjusting the weight assigned evidence conditional on its identity congruence.” (Kahan, 2015b, pg.). That is, a valid design must demonstrate that citizens use different standards for assessing congenial and uncongenial evidence. This, in turn, requires randomly assigning subjects to conditions where the only thing that varies is the identity-protective stake subjects have in crediting *one and the same piece of evidence*” (ibid). All aspects of the evidence relevant to assessing its credibility are held constant, isolating congeniality with respect to political preferences as the only thing that changes across conditions. Without such control, there is a possibility that subjects have prior beliefs that legitimately influence their assessment of evidence quality across experimental conditions (e.g., differences in perceived source credibility).

Importantly, this standard casts doubt on a large proportion of the studies in Ditto et al.’s (2019) meta-analysis, specifically, those that examine changes in support for policy proposals as a function of their association with political groups, such as ‘party cue’ designs (Cohen, 2003).<sup>2</sup> Not only do these studies examine posterior beliefs—rather than evidence evaluation—they also confound PMR with the more normatively defensible tendency for citizens to use prior trust in groups as a decision heuristic (Lupia and McCubbins, 1998). Citizens may resist a policy they would otherwise support because they believe its association with a party is relevant information for assessing its value.

To more comprehensively assess the extent to which Ditto et al.’s (2019) meta-analysis

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<sup>2</sup>Ditto et al. (2019) acknowledge this concern, but note that their estimate for non-source-cue studies is similar to that of source-cue studies.

provides strong evidence against the asymmetry hypothesis, we reexamined the 51 studies to determine whether each meets the standard for distinguishing PMR from rational belief updating. To fully consider Baron and Jost’s (2019) objections, we also coded each study for whether it examines a salient issue sharply dividing the left and right in American politics and two other relevant attributes: whether the study has been published (either in a peer-reviewed journal or as a book at an academic press) and whether the sample could reasonably be argued to be representative of left- and right-wing adults nationally. Many of the studies use samples from populations that differ from the broader population in ways that may shape PMR and thus support for the asymmetry hypothesis (e.g., undergraduate students, political elites).<sup>3</sup> In categorizing studies as ‘valid tests,’ we err on the side of *inclusion*. Similarly, when in doubt about key design features, we code the study as meeting the standard for assessing PMR as set out above (a more restrictive approach has little impact on our conclusion). A table featuring the coded studies is included in the appendix.<sup>4</sup>

Of the 51 studies, 20 meet the standard for distinguishing PMR from rational belief updating. Of these, 12 used a ‘representative’ sampling frame (the other 8 used either students or government officials). Of these remaining studies, 9 focused on salient and divisive issues. Of these 9, only 7 are published. It is also worth noting that 4 of these 7 studies are from a single research group, yet account for 86 percent of the combined sample size. Thus, while we agree with many of the points raised in Ditto et al.’s (2019) rebuttal to Baron and Jost’s (2019)—and while this meta-analysis is an important contribution to the literature—there is less evidence against the asymmetry hypothesis than it first appears, and substantial value in further empirical research on this question.

We take up this task with two national survey experiments, described further below. We

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<sup>3</sup>Young adults tend to have less crystallized political attitudes and identities than older adults, which should reduce the extent of PMR. They are also more educated and left-leaning than the general population, especially on the social and cultural issues most closely tied to epistemic needs (Feldman and Johnston, 2014). Thus, right-wing individuals are likely to be underrepresented in student samples and also unrepresentative of the broader population of conservatives in ways that might influence PMR.

<sup>4</sup>We were unable to find information for three of the included studies. According to Ditto et al. (2019), all three are unpublished and two use undergraduate samples, so this does not influence our conclusions.



test both the asymmetry hypothesis and the claim that epistemic needs promote PMR:

(H1) Right-wing political orientation will be positively associated with PMR.

(H2) Epistemic needs for certainty will be positively associated with PMR.

## Alternatives to the Asymmetry Hypothesis

While work on epistemic needs has been influential, research identifies other moderators of PMR that do not predict an asymmetry across ideology. The primary alternative theory is that PMR arises from a psychological investment in one’s political identity. In this view, identity-conflicting information is threatening to social status and self-esteem, with the severity of the threat a function of the *centrality* (or importance) of politics in the overall self-concept. As Leeper and Slothuus (2014) explain, “The relationship between identity strength and motivated reasoning is similar to the relationship between attitude strength and motivated reasoning. The goal to defend attitudes is proportionate to the strength of those attitudes, with stronger attitudes—those held to be more personally important or, perhaps, held with greater certainty—demanding need for defense and weaker attitudes producing lower defensive motivation” (pg. 143). As with epistemic needs, this hypothesis lacks direct tests with proper measures of both identity centrality and PMR. As an alternative to the asymmetry hypothesis, we thus test the *political identity centrality hypothesis*:

(H3) Political identity centrality will be positively associated with PMR.

Another line of research suggests that domain-relevant expertise increases PMR. The logic is that experts are more skilled at resisting uncongenial information and reasoning their way to a desired conclusion (Kahan et al., 2017; Taber and Lodge, 2006, e.g.,). As Kunda (1999) famously argued, directionally motivated reasoning is not unbounded, and people feel pressure to provide reasons for their beliefs that would be acceptable to a dispassionate observer. Political expertise—and other forms of knowledge useful in the political realm (e.g.,

scientific literacy)—make it easier to rationalize the rejection of arguments and information that threaten one’s priors. Kahan (2013, 409) suggests this may even extend to domain-general “thinking dispositions” (Stanovich, 2011), such as the tendency toward cognitive reflection: “Their capacity to make sense of more complex forms of evidence...will supply them with a special resource that they can use to fight off counterarguments or to identify what stance to take on technical issues more remote from ones that that [sic] figure in the most familiar and accessible public discussions” (but see Arceneaux and Vander Wielen, 2017, for a different perspective). In line with this literature, we test the political expertise hypothesis:

(H4) Politically-relevant expertise will be positively associated with PMR.

## Study 1

We recruited 2,085 U.S adults aged 18 years and older to participate in a 15-minute survey between May 22-24, 2018. Our sample was drawn from Lucid, a platform that connects researchers to a pool of online research participants drawn from over 250 respondent providers. Recent research finds that samples drawn from Lucid closely match the demographic and political composition of the U.S. population, replicate experimental findings, and feature respondents who are less professionalized and politically sophisticated than respondents from other non-probability samples (Coppock and McClellan, 2019). We used quota sampling to ensure a sample that appeared similar to the general adult population represented on the Census Bureau’s 2016 American Community Survey on age, gender, race and ethnicity, and region. Eighty-seven percent of respondents passed two attention checks resulting in a final analytical sample of 1,816 respondents.

## Experiment 1: Evidence Interpretation

In Experiment 1, we examine the extent to which interpretation of numeric information about politics is biased by political attitudes and identities. We leverage the experimental framework introduced by (Kahan et al., 2017), in which participants are asked to interpret the results of a study conducted about the effects of a partisan policy (e.g., gun control). These results are randomized to either support a traditionally liberal or conservative position (e.g., that gun control is effective or ineffective). Thus, participants receive information that either supports their prior political views (i.e., *congenial information*) or conflicts with them (i.e., *uncongenial information*).<sup>5</sup> Because we change only the direction in which the political information points, we are able to manipulate only the ‘stake’ that respondents have in the information while holding all other aspects constant. Moreover, respondents are only asked to decide which of two conclusions about the study’s results is correct, rather than report their posterior beliefs or attitudes about the policy itself. The combination of these two characteristics allows for a clean measure of PMR that is not confounded by simple Bayesian updating (Kahan, 2015b; Baron and Jost, 2019).<sup>6</sup>

We expand upon Kahan et al.’s (2017) experimental framework in two critical ways. First, we use a wider set of salient partisan political issues than previous studies. Participants in our study were randomly assigned to receive information about one of five divisive partisan issues: gun control, immigration, abortion, the minimum wage, or affirmative action. Second, while prior studies often classify information as congenial or uncongenial based on party identification and/or self-placement on an ideological scale, it is possible that this

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<sup>5</sup>As explained in detail by Kahan et al. (2017), this design creates a context in which the most commonly used heuristics generate the *wrong* answer. Getting the correct answer thus requires effortful engagement with the data to ensure that the seemingly obvious conclusion is truly the right one. PMR is indicated by a selective willingness to invest this effort only when the intuitive answer threatens one’s identity. This tendency is typically referred to as ‘motivated skepticism’ or ‘disconfirmation bias’ (Ditto and Lopez, 1992; Taber and Lodge, 2006). It suggests that citizens are setting a higher threshold of acceptance for uncongenial information (Kahan, 2015b). A real world example is the tendency to accept a congenial conclusion based on a single report, but to look for multiple converging reports for an uncongenial conclusion.

<sup>6</sup>In all of our experiments, participants are debriefed and told that the information provided in the studies was entirely fictional.

operationalization fails to account for heterogeneity in attitudes within these political groups, and thus attenuates the difference between the left and right. Indeed, a fundamental finding in the political behavior literature is that a large segment of the population is ideologically unconstrained, possessing beliefs and attitudes that map imperfectly to elite divisions (Converse, 2006; Feldman and Johnston, 2014). Therefore, our primary operationalization of information congeniality uses participants’ positions on the relevant issues (we also consider partisanship and ideology).

Information is presented to participants in the form of a narrative about a local government that has conducted a study to determine how a policy (e.g., becoming a sanctuary city) affects an outcome (e.g., the crime rate). Participants are provided with reasons why the policy could affect the outcome. For example, in the case of immigration, protecting immigrants from federal law enforcement could increase crime by creating a haven for immigrants to commit crimes, or decrease the crime rate by enabling immigrants to report crimes to local authorities without fear of being deported. Participants are then presented with results from the study in the form of a 2x2 table reporting the frequency of the outcome for cities across two attributes: whether they had implemented the policy (rows) and whether the outcome in each group had increased or decreased during a specific time interval (columns). We provide an example for the issue of gun control in Figure 1, and include the full wording of the remaining issue conditions in the appendix.

To manipulate the direction to which the evidence points while holding all other information constant we interchange the names of the columns in the frequency table. For gun control, half of participants were randomly assigned to view the table as it is presented in Figure 1, while for others the first column was titled “Decrease in crime rate” and the second was titled “Increase in crime rate.” This simple manipulation reverses the value of the correct answer. For instance, participants correctly interpreting the information presented in Figure 1 should state that the proportion of cities that did ban handguns in which the crime rate increased  $\frac{223}{(22375)} \approx 75\%$  was less than the proportion of cities that did not ban handguns in

## Design of Experiment 1

A city government is trying to decide whether to pass a law banning private citizens from carrying concealed handguns in public. Government officials are unsure whether the law will increase crime by making it harder for law-abiding citizens to defend themselves against violent criminals or decrease crime by limiting the number of people carrying weapons.

To answer this question, researchers completed a study that compared changes in crime rates between cities that did or did not ban concealed handguns.

The number of cities for which the crime rate increased and decreased in each group are recorded in the table below. The exact number of cities in each group is not the same, but this does not prevent assessment of the results.

	Increase in crime rate	Decrease in crime rate
Cities that <u>did</u> ban concealed handguns	223	75
Cities that <u>did not</u> ban concealed handguns	107	21

Which of the following statements about this study is true?

- ☐ Cities that enacted a ban on carrying concealed handguns were more likely to have a decrease in crime than cities without bans.
- ☐ Cities that enacted a ban on carrying concealed handguns were more likely to have an increase in crime than cities without bans.

**Figure 1:** Liberal-leaning evidence about gun control condition. The conservative-leaning evidence condition interchanges the words ‘increase’ and ‘decrease’ in the column headers.

which the crime increased  $\frac{107}{(107+21)} \approx 84\%$ . When the order of the column names is reversed, however, the correct answer changes as well. We designed each of the 5 vignettes to include the same numbers in each cell. Our dependent variable is simply respondents' choice over the two statements which we code as '1' for correct answers and '0' for incorrect answers.

While this design allows us to replicate past work—and is a substantial improvement over studies using source cues and posterior beliefs and attitudes—one might argue that it cannot *entirely* remove Bayesian updating as a contributor to the appearance of PMR. Specifically, if there is subjective uncertainty in respondents' calculations, their prior expectations for the outcome of the study *may* have an influence on their final answer. This would not be PMR as we understand it. In turn, we supplement these results with a new design that does not possess this limitation.

## Experiment 2: Study Evaluation

While citizens often come into contact with numeric political information directly, they also commonly encounter claims drawn from such information. Indeed, news reports often feature claims based on scientific studies relevant to salient political issues that vary in credibility, and judging the merit of these claims and findings is an essential task of democratic citizenship. In Experiment 2, we asked participants to assess the quality of an empirical study based on their own internal standards for what constitutes reliable and valid research. Participants were randomly assigned to receive information about a study related to one of the four issues they did not receive information about in Experiment 1. As in Experiment 1, participants were randomly assigned to receive information that supported either a liberal or conservative policy position, independent of their assignment in Experiment 1. For instance, participants who were randomly assigned to the minimum wage issue in Experiment 2 were told the following:

Researchers recently ran a study that found that raising the minimum wage leads to an increase [decrease] in unemployment. The study compared changes

in unemployment rates in 25 cities that raised the minimum wage and 25 cities that did not. Researchers found that unemployment increased [decreased] by 70% more in cities that raised the minimum wage, compared to those that did not.

We manipulate whether the study supported a traditionally liberal or conservative position by interchanging the words “increase” and “decrease.” Participants in one condition (shown above) were told that unemployment increased by 70% more in cities that raised the minimum wage, while other participants were told that unemployment *decreased* by 70% more in cities that raised the minimum wage.

Participants were then asked to evaluate the study based on two criteria: the adequacy of its sample size and its potential for drawing causal inferences. Participants were told, “Researchers always need to balance costs and benefits when designing a study. Using a larger sample of cities allows for stronger conclusions, but also makes the study more expensive,” and asked, “Do you think a sample of 50 cities is smaller than necessary, larger than necessary, or about the right size to determine whether raising the minimum wage leads to changes in the unemployment rate?” Participants answered on a 7-point scale ranging from ‘much smaller than necessary’ to ‘much larger than necessary’. Participants then read the following: “Sometimes, one thing causes another. For example, the summer heat causes people to eat more ice cream. But sometimes two things are only related to each another [sic], because they are both caused by the same thing. For example, eating ice cream and wearing shorts are only related to each another [sic], because they are both caused by the summer heat (eating ice cream does not cause you to wear shorts),”<sup>7</sup> and were asked: How much do you agree or disagree with the following statement? “This study provides at least some evidence that raising the minimum wage causes changes in the unemployment rate.” Participants responded on a seven-point scale from ‘Disagree strongly’ to ‘Agree strongly.’

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<sup>7</sup>As indicated in the passage, there were two typos in the final version seen by respondents, both of which used ‘another’ instead of “other.”

Thus, respondents were not asked about their posterior beliefs regarding the policy in question, but only about the quality of the study design. The direction of the study’s findings should be irrelevant to such judgments. This design is similar to early motivated reasoning studies (Ditto and Lopez, 1992; Kunda, 1999) and mirrors the task faced by reviewers in a “results-free review” process. Note also that we make no assumptions about the sophistication of participants’ standards for assessing research because we are only interested in whether they apply their standards consistently. That is, even if participants’ reasons for their evaluations are poorly justified, they can still be unbiased in the application of those reasons across contexts.

## **Pre-Treatment Measures**

### **Evidence Congeniality: Ideology, Party ID, and Issue Positions**

To determine how the evidence evaluated by respondents in the experiments aligned with their political attitudes, we include three measures: ideology, party identification, and issue positions. Party identification and ideology were each measured on standard 7-point scales, and Independents who reported leaning toward either party were classified as Democrats or Republicans. To measure issue positions we asked respondents to express their attitudes about the five political issues featured in Experiments 1 and 2, each measured on 6-point scales ranging from ‘strongly agree’ to ‘strongly disagree’. Respondents reported the extent to which they supported or opposed “allowing people to carry concealed guns in more places,” “raising the minimum wage to \$15 an hour,” “allowing universities to increase the number of minority students studying at their schools by considering race along with other factors when choosing students,” “punishing ‘sanctuary’ cities for refusing to assist federal authorities detain and deport illegal immigrants by taking away their federal funding,” and “restricting access to abortions.”

For our primary analyses, we code partisanship, ideology, and issue positions into binary indicators for right-wing respondents (where left-wing respondents are coded 0, right-wing



respondents are coded 1, and independents and moderates are excluded). However, we also replicate our analyses using continuous measures of partisanship, ideology, and issue positions and compare participants at the extremes of left and right (see appendix).

### **Moderators of PMR: Epistemic Needs, Political Identity Centrality, and Expertise**

As our primary operationalization of epistemic needs, we measure Need for Closure (NFC) using the two highest loading items on each of the five sub-facets of NFC from Roets and Van Hiel’s (2011) abbreviated 15-item scale. Respondents were asked to read 10 statements (e.g., “I don’t like situations that are uncertain in many different ways”) and decide how much they “agree with each according to your beliefs and experiences” on a 6-point scale ranging from strongly disagree to strongly agree (Cronbach’s  $\alpha = .84$ ). In addition to NFC we measured two other personality constructs that are closely linked to left-right political orientation and have conceptual overlap with epistemic needs for certainty. First, we use items from the Portrait Values Questionnaire (Schwartz et al., 2001), which measure the conservation versus openness value dimension as conceptualized by (Schwartz, 1992). Second, we include 5 items measuring the intellect/imagine dimension of openness to experience using the Mini-IPIP (Donnellan et al., 2006), a shortened version of the 50-item International Personality Item Pool Five-Factor Model measure.<sup>8</sup>

We include two measures of political identity centrality. First, we use Federico and Ekstrom’s (2018) measure of centrality, which is adapted from Luhtanen and Crocker (1992). Respondents were asked to rate the extent of their agreement (on a seven-point scale) with four statements, an example of which reads, “In general, my political attitudes and beliefs are an important part of my self-image.” Second, we use Huddy et al.’s (2015) measure of partisan identity strength. An example item reads, “How important is being a [Democrat/Republican] to you?” This instrument narrowly measures the centrality of *political*

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<sup>8</sup>We include a more detailed discussion of these measures in the appendix.

*partisanship* to the self-concept (i.e., its personal importance, degree of internalization) and is thus less general than the first measure. In turn, we test partisan strength as a moderator only when examining PMR via partisanship and Federico and Ekstrom’s (2018) measure of centrality when examining PMR via issue positions and ideology. Importantly, both measures are used to test the same hypothesis—that PMR increases as one’s psychological investment in a political identity increases.

We also include two measures of expertise. First, we measure political knowledge using 5 items (e.g., identifying the Speaker of the House). Second, because Experiment 1 requires respondents to interpret numeric evidence by calculating proportions from raw frequencies, we also include a measure of numeracy, or quantitative literacy. We use Weller et al.’s (2013) 7-item numeracy assessment, in which respondents answer quantitative problem-solving questions ranging from simple addition to complex division (see appendix).

## Study 2

To replicate our test of ideological asymmetries in PMR we collected a second national sample of 1,816 U.S. adults on the 2018 Cooperative Congressional Election Study (CCES).<sup>9</sup> Respondents were again randomly assigned to judge the quality (sample size and potential for causal inference) of a research design after reading about the study’s conclusions. Due to the limited range of issue position questions asked on the pre-election wave of the CCES, respondents were randomly assigned to a subset of the issues used in Study 1: gun control, immigration, and abortion. We again use partisanship, ideology, and issue positions to operationalize congeniality. Issue-specific preferences were measured with a wide range of questions from the pre-election survey (see appendix). We were unable to include our lengthy battery of moderators for this second study, and thus our focus is on differences in PMR across political groups.

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<sup>9</sup>We made an a priori decision to analyze results from the full unmatched sample provided by YouGov (N = 1,816) rather than the much smaller matched sample (N = 1,000). See the appendix for a replication of the analyses with the weighted matched sample.

# Results

## Ideological Asymmetries in Politically Motivated Reasoning

We begin by assessing the extent of ideological asymmetries in PMR using the Lucid data (Study 1). For Experiment 1, we run separate logistic regression models for respondents who were randomly assigned to receive left- and right-leaning evidence. In each model we regress an indicator for correct interpretation of the evidence (0 = incorrect interpretation, 1 = correct interpretation) on an indicator for right- or left-wing orientation and dummy variables for issue assignment. We ran separate sets of models for each of the three operationalizations of left-right preferences. We then calculated predicted probabilities of correctly interpreting the evidence for each political group within each model. These are plotted with 95% confidence intervals in Figure 2.<sup>10</sup>

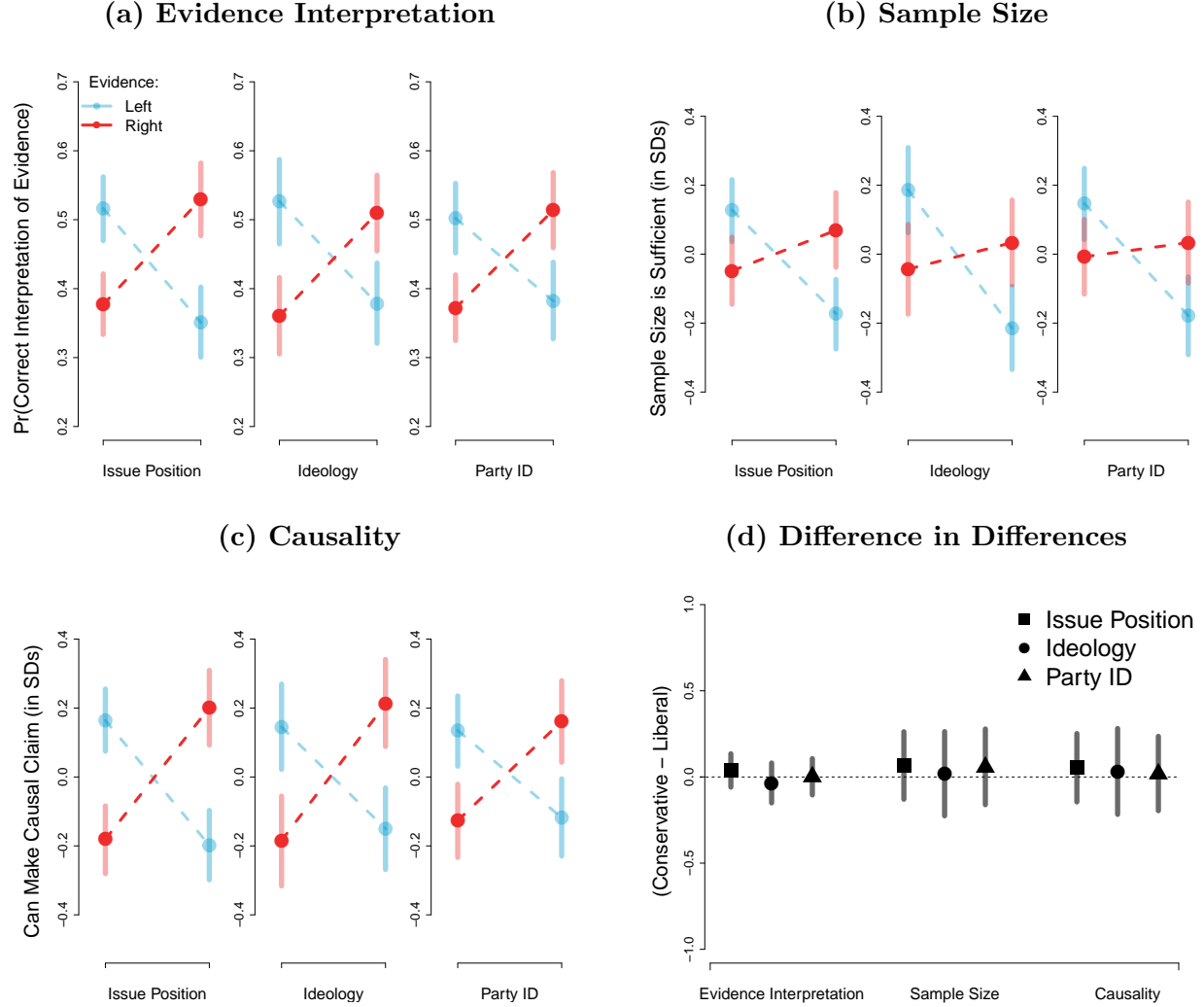
We follow a similar approach for analyzing the two outcomes in Experiment 2, and estimate linear models using ordinary least squares predicting judgments about sample size and ability to draw causal conclusions about the study. Scales for these outcomes were standardized, such that they have a mean of zero and a standard deviation of one. We again generate predictions from these models and plot them separately for left-leaning and right-leaning evidence in Figure 2.

Across all experimental outcomes, and for each operationalization of a respondent’s left-right orientation, we find no evidence for the asymmetry hypothesis. Interpretations of left-leaning evidence in Experiment 1 are significantly more accurate for liberal participants than conservative participants, while interpretations of right-leaning evidence are significantly more accurate for conservatives than liberals. These biases are substantial: the probability of a correct inference increases by between 10-20 percentage points moving from uncongenial to congenial information. We find a similar pattern in Experiment 2. Studies congenial to

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<sup>10</sup>Uncertainty in these estimates was calculated by simulation from the sampling distribution for each model. We used the “observed-value” approach, in which quantities of interest are calculated by averaging over the respondent-specific estimates which are conditional on their respective values of all model variables (?).

## Ideological Asymmetries in Motivated Reasoning (Study 1)



**Figure 2:** Predicted levels of experimental outcomes by condition (left-leaning or right-leaning information) and respondents' left-right orientation. The bottom-right panel displays the difference between how left-leaning and right-leaning participants evaluate congenial versus uncongenial evidence, where positive values reflect right-leaning respondents engaging more in PMR.

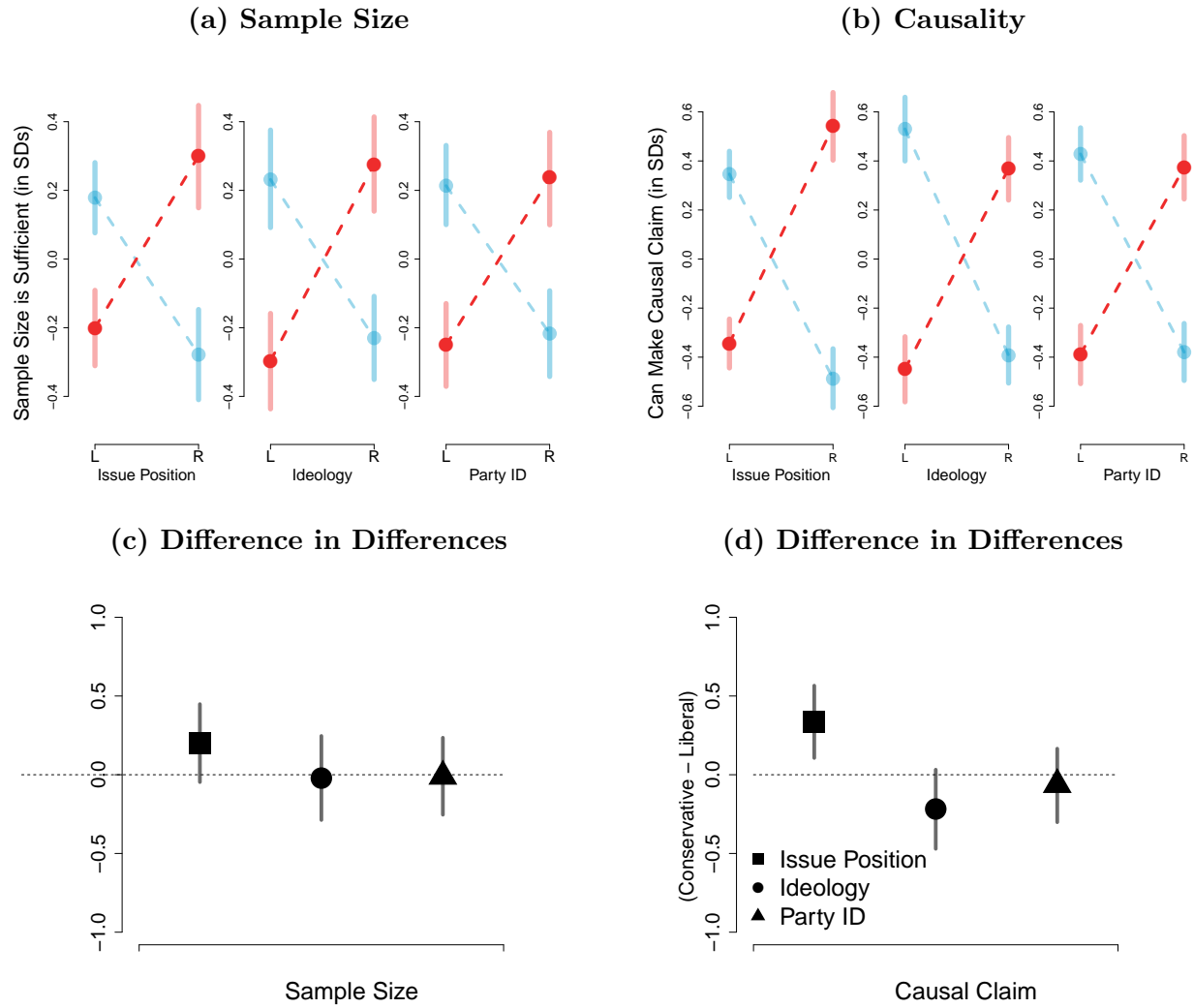
left-wing interests are judged more favorably by liberals and less favorably by conservatives, while the reverse is true for studies congenial to right-wing interests. Again, the biases are substantively meaningful at between 0.15 to 0.30 standard deviations.

We take the difference between conditions in expected values of the outcome variable as a measure of PMR in each group. We subtract the difference for left-wing respondents (i.e., people with left-leaning issue positions, liberals, or Democrats) from the difference for right-wing respondents. Positive values of this difference in differences indicate that conservatives are more likely to engage in PMR than liberals, while negative values indicate the opposite. A value of zero indicates no differences in PMR between groups. We plot these, along with their associated 95% confidence intervals, in the fourth panel of Figure 2. None are statistically distinguishable from zero and all estimates are very close to zero.

We observe very similar patterns in our replication of Experiment 2 on the CCES (Study 2), as shown in Figure 3. Once again, both left-wing and right-wing respondents are engaging in PMR. For the sample size outcome we find no significant difference in differences comparing left-wing to right-wing citizens, though the estimate is positive when operationalizing left-right orientation with issue positions. For the causality outcome, we observe a statistically significant difference in differences in the direction predicted by the asymmetry hypothesis for issue positions. However, we also observe a difference in differences of a similar size, though not quite statistically significant, in the *opposite direction* when left-right orientation is operationalized with ideology. The third operationalization of left-right orientation, partisanship, yields a difference in differences close to zero.

In sum, we find little evidence for the asymmetry hypothesis. Across two studies and three distinct experimental outcomes, five salient partisan issues, and three measures of left-right preferences, our results suggest that liberals and conservatives engage in PMR to approximately the same extent. While Study 2 uncovered three cases in which one group was more biased than the other, only one of these was statistically significant with a (local) alpha set to 0.05, and the direction of the asymmetry was inconsistent across the cases.

## Ideological Asymmetries in Motivated Reasoning (Study 2)



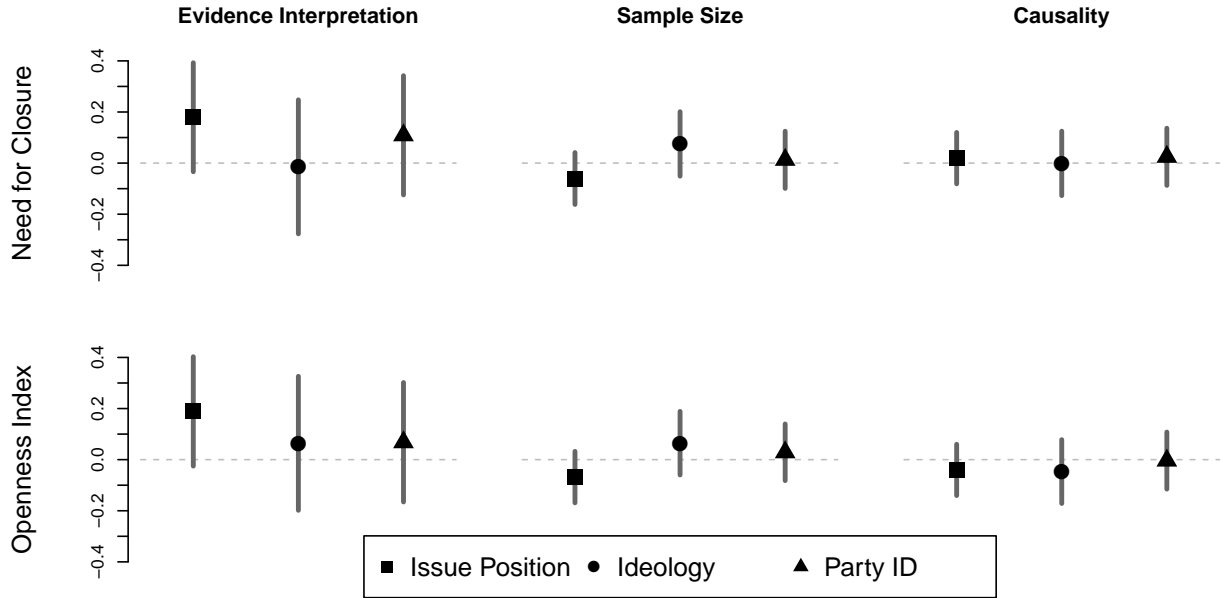
**Figure 3:** Replication of Experiment 2 using the full unmatched 2018 CCES dataset.

## The Moderating Effect of Epistemic Needs

Given robust evidence for a link between right-wing preferences and epistemic needs for certainty, the lack of consistent evidence for ideological asymmetries in PMR in these experiments (as well as the meta-analysis in Ditto et al. (2019)) is surprising. Indeed, in our 2018 Lucid sample, respondents who identify as extremely conservative are 0.63 standard deviations higher in need for closure than those who identify as extremely liberal (see appendix). Converging with past work, there is a tension between findings relying on self-reported personality traits and those that examine PMR directly in an experimental context. If such needs are a strong predictor of PMR, then there is indeed a conflict between these two sets of findings. If, however, needs for certainty are a weak or unreliable predictor, then the tension dissolves. We thus turn to Study 1 and a direct test that epistemic needs are associated with PMR.

To maximize power for detecting a moderating effect of epistemic needs, we first coded respondents' right-left preferences so that the value '1' corresponds with receiving congenial information and the value '0' corresponds with receiving uncongenial information. For example, in Experiment 1, whenever the frequency table provides information congenial to right-wing interests, respondents' preferences are coded so that '1' means conservative and '0' means liberal. When information is congenial to left-wing interests, by contrast, respondents' preferences are coded in the opposite direction. Thus, when we regress our dependent variables on this congeniality measure, a positive coefficient implies PMR: respondents for whom the evidence is congenial are more accurate (Experiment 1) and more positive toward the research design (Experiment 2). The epistemic needs hypothesis is operationalized as an interaction between congeniality and NFC. If NFC promotes PMR, then the coefficient for congeniality should be larger (more positive) as NFC increases. We thus expect a positive interaction coefficient. All models also include interactions between congeniality and both political identity centrality and political expertise. We discuss the results for these latter moderators subsequently.

## Moderating Role of Need for Closure and Openness



**Figure 4:** Coefficients for the interaction between epistemic needs and information congeniality on each of the three experimental outcomes in the Lucid data. Vertical lines represent 95% confidence intervals. Positive coefficients indicate that respondents with higher needs for certainty engage more in PMR.

While NFC is the focus of much research, it is possible that this construct does not fully cover the variation in openness to new information central to PMR. Therefore, we run a parallel set of analyses with an index containing the additional items from Schwartz value theory and openness to experience discussed above. Combining all personality items forms a reliable scale (Cronbach’s  $\alpha = 0.82$ ) and we observe large differences in this index across our operationalizations of right-wing preferences: respondents who identify as extremely conservative are 0.97 standard deviations higher in the trait index than those who identify as extremely liberal. Both NFC and the full trait index were standardized to have a mean of 0 and a standard deviation of 1.

In Figure 4, we report the relevant interaction coefficients.<sup>11</sup> Across three operationalizations of left-right preferences, and two operationalizations of epistemic needs, we find no

<sup>11</sup>Coefficients for the evidence interpretation outcome were estimated with logistic regression models (and are in log-odds space), while those for the sample size and causality outcomes were estimated with OLS models.

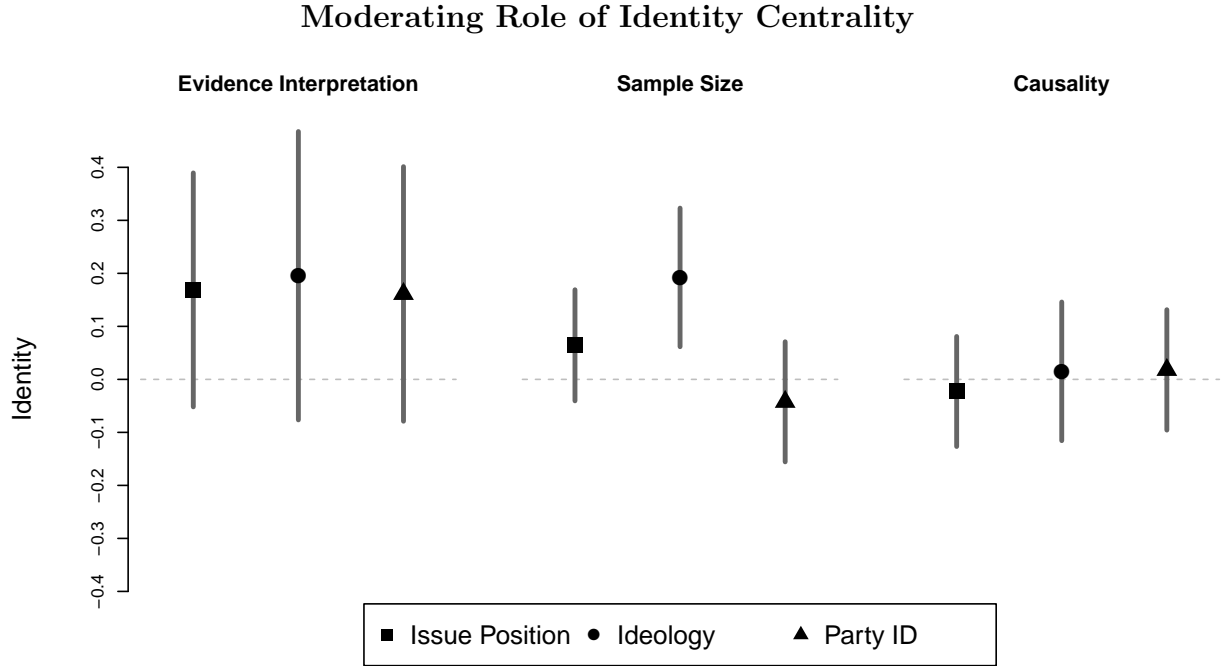


reliable evidence for the theoretical claim underpinning the asymmetry hypothesis. None of the estimated interaction terms are statistically significant and only two even approach significance. The remainder hover about zero and contain both positive and negative values. As discussed previously, this result dissolves the apparent tension between the literature on personality and ideology and the experimental literature on PMR. Simply put, while right-wing citizens show higher needs for certainty than left-wing citizens, such needs play little role in shaping the extent of PMR.

## **Alternatives to the Ideological Asymmetry Hypothesis**

If NFC has little impact on PMR, what underpins the substantial degree of bias observed in the public? A primary alternative emphasizes the centrality of politics to the self-concept: citizens who are heavily invested in their political beliefs and identities are more likely to engage in PMR. The relevant interaction terms testing the political identity centrality hypothesis are shown in Figure 5. We use Federico and Ekstrom’s (2018) measure when operationalizing congeniality with issue positions and ideology, and Huddy et al.’s (2015) measure when operationalizing congeniality with party ID. Both measures were standardized to have a mean of 0 and standard deviation of 1. We find only weak evidence for this alternative theory. The interaction is always positive and substantively meaningful for the evidence interpretation task, but never attains statistical significance. Two of three coefficients are positive for the sample size task, but only one is statistically significant. Finally, there is no evidence that identity centrality shapes PMR in the causal inference task. Thus, identity centrality is at best an unreliable moderator of PMR in our data.

As discussed previously, a second line of research argues that political expertise facilitates PMR. We report the relevant interaction coefficients in Figure 6, where both political knowledge and numeracy are standardized to have a mean of 0 and standard deviation of 1. We find mixed support. First, we replicate Kahan and colleagues’ work (Kahan et al., 2017) and find that numeracy increases the extent of PMR when congeniality is measured with

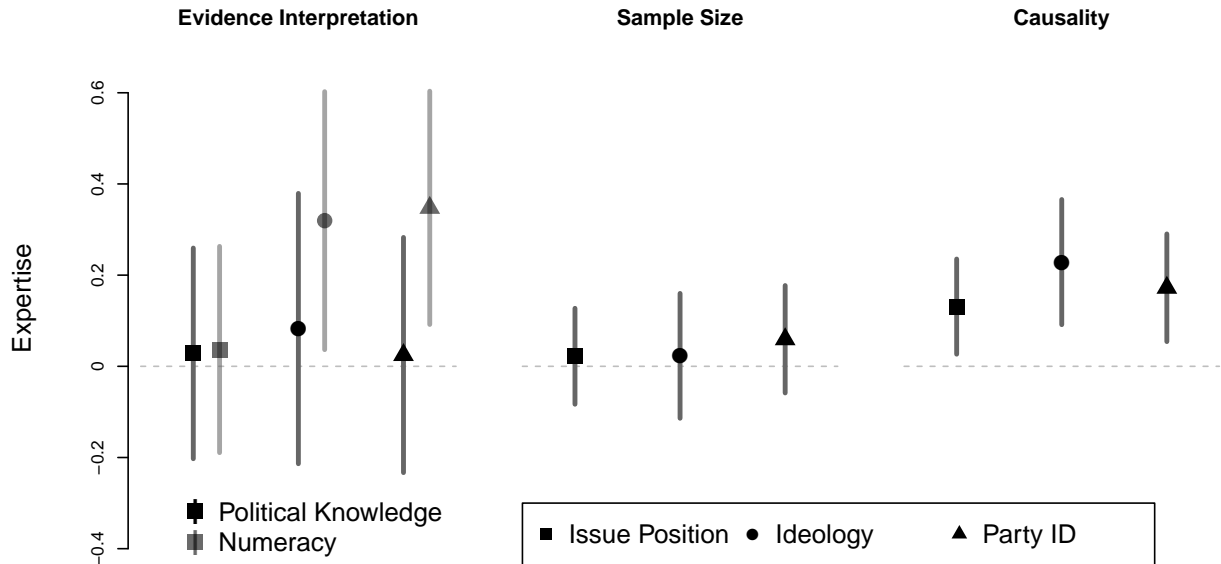


**Figure 5:** Coefficients for the interaction between political identity centrality and information congeniality on each of the three experimental outcomes in the Lucid data. Vertical lines represent 95% confidence intervals. Positive coefficients indicate that respondents with higher levels of centrality engage more in PMR.

either partisanship or ideology. Both effect sizes are substantial and statistically significant. Second, we find with all three operationalizations of congeniality that political knowledge increases the extent of PMR on the causal inference outcome. Again, the effect sizes are substantively meaningful and statistically significant. We find no evidence, however, that political knowledge increases PMR in the evidence interpretation task or the sample size outcome.

In sum, we find little evidence for the moderating role of political identity centrality. Consistent with past theorizing and experimental work, we do find support for the hypothesis that domain-specific expertise facilitates PMR, but our results also suggest substantial variation in this effect across judgment context. While the ‘motivated numeracy’ effect (Kahan et al., 2017) appears to be a reliable result, political knowledge only increased PMR in judgments concerning causal inference. Exploring this variation further is a topic for future research.

## Moderating Role of Expertise



**Figure 6:** Coefficients for the interaction between politically-relevant expertise and information congeniality on each of the three experimental outcomes in the Lucid data. Vertical lines represent 95% confidence intervals. Positive coefficients indicate that respondents with higher levels of expertise engage more in PMR.

## General Discussion

This paper examines asymmetries in political bias across left-right orientation in American politics. In doing so, it aims to resolve a tension in the existing literature on personality, political ideology, and politically motivated reasoning. On one hand, decades of research document a sizeable relationship between needs for certainty and right-wing political preferences (Jost, 2017). On the other, a growing literature suggests that the left and right are equally biased when it comes to politics (Ditto et al., 2019). We examine the roots of this disconnect in two ways. First, we examine differences in bias between the left and right in two national survey experiments. Second, we provide a direct test of the claim that epistemic needs promote PMR. We find little support for the asymmetry hypothesis in either set of tests. We conclude that the tension between these literatures is illusory: while conservatives do indeed score higher in needs for certainty, these needs play little role in PMR.

Our paper also extends the literature on PMR by examining the moderating role of political identity centrality. Past work argues that citizens for whom politics is especially important to their self-concept will feel a strong motivation to attack information that threatens their political identity. Despite its importance to the literature—and its intuitive appeal—we find at best weak support for this hypothesis. We can only speculate as to the reason for this null result. One possibility is that *general* centrality matters less than the personal importance of specific issue positions (i.e., issue publics), but recent work casts doubt on the importance of issue importance in the context of voting (Leeper and Robinson 2019). Another possibility is that political identity centrality matters primarily among political experts. That is, PMR is evident primarily among citizens with *both* the motivation *and* the ability to counter-argue new information. This is plausible given that expertise (numeracy and political knowledge) increases PMR in both prior research and our own study. While concerns with power make us wary about testing this with our current data, in the appendix we report estimates for this three-way interaction, pooling across experimental outcomes (Bakker et al., 2020). The results are suggestive of this relationship, but inconsistent across tests and often statistically insignificant. This remains an interesting question for future research.

There are other limitations to the conclusions we can draw from our study. For example, we have examined the evaluation of politically-relevant evidence, but bias can enter the belief formation process at other stages, such as information-seeking (Iyengar and Hahn, 2009) and the integration of likelihoods with priors (Hill, 2017). It is possible that asymmetries exist, or these moderators operate, primarily through one of these other pathways. For example, citizens high in certainty needs may simply avoid contact with information sources they expect to provide uncongenial information, or they may inflate the strength of their priors in the presence of conflicting evidence. We believe that evaluation of new information is particularly important to democratic citizenship, but future work should consider other possible mechanisms.

Another possible limitation is that the tasks faced by participants in our studies are difficult and the asymmetry hypothesis may find greater support in less quantitative contexts. This is especially relevant to Experiment 1, in which participants needed to examine a contingency table and possibly perform calculations. While we acknowledge this concern with generalizability, we do not think it prevents drawing important conclusions about the real world from our study. First, making inferences from numerical information is a common task of democratic citizenship and is thus of interest in its own right, even if other (easier) tasks produce different results. Second, this criticism applies less forcefully to Experiment 2, in which respondents are not required to complete any calculations, and simply judge a study’s design. As previously noted, respondents’ level of sophistication with respect to research design is irrelevant to our inferences: *whatever* standards they use, no matter how nonsensical, they should apply them consistently across experimental conditions. Moreover, the task in Experiment 2 mirrors common real world contexts in which citizens need to assess the credibility of claims appealing to scientific evidence. For example, recent work suggests that citizens evaluate public opinion polls as more credible when the results support their favored position (Madson and Hillygus, 2019).

On one hand, our results can be read as normatively positive in the sense that an asymmetry in PMR would imply differences in bottom-up accountability pressures faced by political elites of the left and right. We find no evidence for such differences. On the other hand, our conclusions converge with prior research that finds substantial biases in political reasoning and judgment. Thus, there is reason to be concerned about public monitoring of elites in general, even if we do not worry about differences in accountability across political groups due to PMR (of course, differences in accountability could arise from other sources).

Overall, however, our results suggest that scholars know less about the origins of PMR than previously thought. Two influential hypotheses regarding individual differences in political bias—epistemic needs and political identity centrality—find little support in our data, though there is accumulating evidence that various forms of expertise, such as numeracy and

political knowledge, are important in facilitating PMR. Future work should further explore interactions among motives and ability as well as alternative pathways by which individual differences shape the nature and extent of political biases.

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# Online Supplementary Appendix

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## Additional Discussion of Lucid Design

In the United States, there were approximately 17.5 million unique visitors to Lucid Marketplace during the sixth-month period preceding January 2019 (Lucid 2019). Lucid determines unique respondents within each survey through a combination of IP address, a unique Lucid identification number, and a unique panel identification number (Lucid, private correspondence).

To avoid obtaining a sample that was unrepresentatively interested in politics, we did not advertise the Lucid study as relating to politics. Instead, potential respondents were told that “this study is a brief survey about yourself and your opinions and attitudes.

As discussed in the manuscript, respondents who failed at least one of the two attention checks were prevented from completing the remainder of the survey. Additionally, respondents who proceeded to use a mobile device for the survey (despite being instructed that they would be unable to complete the survey) were prevented from completing the survey. The first attention check asked respondents to identify the current President of the United States (out of a list containing the names of Theresa May, Donald Trump, Paul Ryan, or John Stillerman) and appeared in conjunction with nearly identical questions asking respondents to identify other office holders, while the second appeared among a battery of math and problem-solving questions measuring numeracy and asked respondents to add  $2 + 2$ . The question was designed to mimic the appearance of other numeracy questions (described below) and read: “Bethie lives on a farm and owns two brown water barrels. Her next-door neighbor, Steve, owns two red water barrels. If Bethie and Steve combine their water barrels, how many water barrels do Bethie and Steve own together?” While it is possible that these survey questions biased our sample toward those who are more politically sophisticated and numerate, we assume that American adults paying attention to the survey can identify Donald Trump as the president and 4 as the sum of  $2 + 2$ . 1.4% of respondents were removed for using a mobile device, 5.9% were removed for failing the Trump attention check (correctly identifying Trump as the president of the United States), and 6.9% were removed for failing the numeracy attention check (correctly adding  $2 + 2$ ).

## Additional Discussion of CCES Design

YouGov aims to mimic a representative sample of the target population through a three-stage process. First, a stratified (by age, race, gender, and education) random sample is drawn from the sampling frame for the target population (U.S. adults) which is constructed from the American Community Survey, the Current Population Survey, and the Pew U.S. Religious Landscape Survey. Second, the closest matching respondent in a sample of YouGov’s pool of opt-in panel respondents is found for each member of the target population sample. Finally, the matched cases are weighted to the constructed sampling frame. The data release includes both the unmatched and matched samples. The unmatched sample is the set of all respondents who completed the survey ( $N = 1,816$ ). The matched sample is the subset of these respondents who constitute the closest matches to the target population sample from the unmatched sample ( $N = 1,000$ ). We made an a priori decision to analyze results from the *unmatched* sample because it provides a substantially larger sample size and was the sample on which the initial experimental randomization occurred. The unmatched sample also

has the benefit of containing more respondents from YouGov’s own panel than the matched sample, which contains participants from unknown non-YouGov panels. We report analyses using the matched CCES sample with weights in the Appendix and discuss the results in the appropriate section.

## **Pre-Treatment Measures**

### **Issue Positions (Lucid)**

While each respondent was ultimately only given information about two of these issues, all five issue position questions were asked to mitigate the risk of drawing attention to the intent of the survey. For the same reason, these issue position questions appeared at the very beginning of the survey, about 10 minutes before respondents received information about the issues in Experiments 1 and 2.

Please indicate how you feel about each of the following proposals. (Strongly favor, Somewhat favor, Slightly favor, Slightly oppose, Somewhat oppose, Strongly oppose)

1. Allowing people to carry concealed guns in more places
2. Raising the minimum wage to \$15 an hour.
3. Allowing universities to increase the number of minority students studying at their schools by considering race along with other factors when choosing students.
4. Punishing "sanctuary" cities for refusing to assist federal authorities detain and deport illegal immigrants by taking away their federal funding.
5. Restricting access to abortions.

### **Issue Positions (2018 CCES)**

Issue positions on the CCES were asked in the form of "for" or "against" questions. For each issue (gun control, abortion, and immigration), we create a mean scale of these items on a scale from 0 to 1, where 0 represents the most liberal position and 1 represents the most conservative position.

#### **Gun Control**

Respondents in the experiment were asked to evaluate evidence about a study examining the effect of banning concealed-carry. This policy is most closely related to the third item below, but all gun control items are used in the index.

"On the issue of gun regulation, are you for or against each of the following proposals?"

- Background checks for all sales, including at gun shows and over the Internet - Ban assault rifles - Make it easier for people to obtain a concealed-carry gun permit

#### **Abortion**

Respondents in the experiment were asked to evaluate evidence about a study that examined the effects of restricting access to abortion. Since all of these items are related to banning abortions, all are included in the abortion index.



"Do you support or oppose each of the following proposals?" 1. Always allow a woman to obtain an abortion as a matter of choice 2. Permit abortion ONLY in case of rape, incest or when the woman's life is in danger 3. Ban abortions after the 20th week of pregnancy 4. Allow employers to decline coverage of abortions in insurance plans 5. Prohibit the expenditure of funds authorized or appropriated by federal law for any abortion. 6. Make abortions illegal in all circumstances.

### **Immigration**

Respondents in the experiment were asked to evaluate evidence from a study examining the effect of preventing federal law enforcement from arresting immigrants (i.e., the effects of a sanctuary city policy). CCES common content has 8 immigration issue position questions. We exclude questions that ask about supporting a compromise, because it is not clear how these compromises map onto a pro-anti immigration spectrum (e.g., "Grant legal status to DACA children, spend \$25 billion to build the border wall, and reduce legal immigration by eliminating the visa lottery and ending family-based migration"). We also excluded items for which only half the sample was assigned to respond.

"What do you think the U.S. government should do about immigration? Do you support or oppose each of the following?"

- Increase spending on border security by \$25 billion, including building a wall between the U.S. and Mexico.
- Provide legal status to children of immigrants who are already in the United States and were brought to the United States by their parents. Provide these children the option of citizenship in 10 years if they meet citizenship requirements and commit no crimes (DACA).
- Reduce legal immigration by eliminating the visa lottery and ending family-based migration.
- Withhold federal funds from any local police department that does not report to the federal government anyone they identify as an illegal immigrant.
- Send to prison any person who has been deported from the United States and reenters the United States.
- Increase the number of visas for overseas workers to work in the U.S.
- Reduce legal immigration by 50 percent.

### **Ideology**

1. Where would you place yourself on this scale? (Extremely liberal, Liberal, Slightly liberal, Moderate; middle of the road, Slightly conservative, Conservative, Extremely conservative)

### **Party Identification**

1. Generally speaking, do you usually think of yourself as a Democrat, a Republican, or as an independent? (Democrat, Republican, Independent, Other party (please specify))
2. Would you call yourself a strong Democrat or a not very strong Democrat? [if R identified as Democrat] (Strong Democrat, Not very strong Democrat)
3. Would you call yourself a strong Republican or a not very strong Republican? [if R identified as Republican] (Strong Republican, Not very strong Republican)

4. Do you think of yourself as closer to the Republican Party or to the Democratic Party? [if R identified as Independent or a member of another party] (Democrat, Republican, Neither)

### Political Knowledge

Respondents were asked to identify the Current Speaker of the House and President of Russia from a list of 5 names, identify the office or job held by John Roberts and Angela Merkel from a list of 5 government positions, and asked the length of a term of office for a US Senator (Cronbach's  $\alpha = .73$ ).

1. Who is the current Speaker of the U.S. House of Representatives? (Nancy Pelosi, Harry Reid, Marco Rubio, Paul Ryan, Don't know)
2. How long is the term of office for a U.S. Senator? (2 years, 4 years, 6 years, 8 years, Don't know)
3. What job or political office is now held by John Roberts? (Chair of the Democratic National Committee, Senate Majority Leader, Chief Justice of the Supreme Court, Chair of the Republican National Committee, Don't know)
4. What job or political office is now held by Angela Merkel? (Prime Minister of the United Kingdom, German Chancellor, Prime Minister of Australia, Secretary of the Treasury, Don't know)
5. Who is the current president of Russia? (Dmitry Medvedev, Vladimir Putin, Boris Yeltsin, Viktor Zubkov, Don't know)

### Numeracy

This next part of the survey asks you some problem solving questions. Please do not use a calculator or look up answers for any of these questions. We are just interested in what you think.

1. In the Big Bucks Lottery, the chances of winning a \$10 prize are 1%. What is your best guess about how many people would win a \$10 prize if 1,000 people each buy a single ticket from Big Bucks? ( ) people.
2. In the Acme Publishing Sweepstakes, the chance of winning a car is 1 in 1,000. What percentage of Acme Publishing Sweepstakes tickets win a car? ( )%
3. If the chance of getting a disease is 20 out of 100, this would be the same as having a ( )% chance of getting the disease.
4. If the chance of getting a disease is 10%, how many people out of 1,000 would be expected to get the disease? ( ) people

5. If Adam can drink one barrel of water in 6 days, and Laura can drink one barrel of water in 12 days, how long would it take them to drink one barrel of water together? ( ) days.
6. Frank received both the 15th highest and the 15th lowest mark in the class. How many students are in the class? ( ) students
7. Imagine that we roll a fair, six-sided die 1,000 times. Out of 1,000 rolls, how many times do you think the die would come up even (2, 4, or 6)? ( ) times

### **Political Identity (Measure 1)**

1. How important is being a Democrat/Republican to you? (Extremely important, Very important, Not very important, Not important at all)
2. How well does the term Democrat/Republican describe you? (Extremely well, Very well, Not very well, Not at all)
3. When talking about Democrats/Republicans, how often do you use "we" instead of "they"? (All of the time, Most of the time, Some of the time, Rarely, Never)
4. To what extent do you think of yourself as being a Democrat/Republican? A great deal, Somewhat, Very little, Not at all

### **Political Identity (Measure 2)**

Please rate the extent to which you agree or disagree with each of the following statements. (Strongly disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Strongly agree)

1. Overall, my political attitudes and beliefs have very little to do with how I feel about myself.
2. My political attitudes and beliefs are an important reflection of who I am.
3. My political attitudes and beliefs are unimportant to my sense of what kind of person I am.
4. In general, my political attitudes and beliefs are an important part of my self-image.

### **Need for Closure**

Past research has used varied measures of NFC. The original scale contains 42 items developed by (Webster and Kruglanski, 1994). Roets and Van Hiel (2011) noted that due to the length of these scales, researchers often pick and choose a much smaller subset somewhat randomly. In turn, they create a 15-item version with high construct validity. Due to the number of traits measured on this survey, we included the 2 highest-loading items on each of the five sub-facets of NFC from Roets and Van Hiel (2011). Respondents were asked to

read 10 statements and decide how much they “agree with each according to your beliefs and experiences” on a 6-point scale from strongly disagree to strongly agree. Examples of statements are: “I don’t like situations that are uncertain”, “I dislike questions which could be answered in many different ways”, “I enjoy having a clear and structured mode of life.” We created an additive index from these 10 items (Cronbach’s  $\alpha = .84$ ).

Please read each of the following statements and decide how much you agree with each according to your beliefs and experiences. (Strongly disagree, Moderately disagree, Slightly disagree, Slightly agree, Moderately agree, Strongly agree)

1. I don’t like situations that are uncertain.
2. I dislike questions which could be answered in many different ways.
3. I find that a well ordered life with regular hours suits my temperament.
4. I don’t like to go into a situation without knowing what I can expect from it.
5. I would quickly become impatient and irritated if I would not find a solution to a problem immediately.
6. I don’t like to be with people who are capable of unexpected actions.
7. I dislike it when a person’s statement could mean many different things.
8. I find that establishing a consistent routine enables me to enjoy life more.
9. I enjoy having a clear and structured mode of life.
10. I dislike unpredictable situations.

### **MINI-IPIP**

How much do you agree with each statement about you? (as you generally are now, not as you wish to be in the future) (Strongly disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Strongly agree)

1. I have a vivid imagination
2. I am not interested in abstract ideas
3. I have difficulty understanding abstract ideas
4. I do not have a good imagination
5. I love to think up new ways of doing things

## Schwartz Values

We include one item measuring each of the value domains that define the openness v. conservation superordinate dimension: tradition, conformity, security, self-direction, and stimulation:

Now we will briefly describe some people. Please indicate for each description how much that person is like you. (Very much like me, Like me, Somewhat like me, A little like me, Not at all like me)

1. It is important to this person to think up new ideas and be creative; to do things one's own way.
2. Living in secure surroundings is important to this person; to avoid anything that might be dangerous.
3. It is important to this person to always behave properly; to avoid doing anything people would say is wrong.
4. Adventure and taking risks are important to this person; to have an exciting life.
5. Tradition is important to this person; to follow the customs handed down by one's religion or family.

## Experiment 1 (Evidence Evaluation Task) Vignettes

Respondents were randomly assigned to received evidence about either: a concealed handgun ban, a minimum wage increase, affirmative action, sanctuary cities, or abortion. Respondents were then randomized to receive evidence that supported the liberal or conservative position on the assigned issue, which was achieved by changing the words "increase" and "decrease" in the column names in the evidence table. The vignettes below all feature "Increase" in the first column and "Decrease" in the second column.

The experiment began with the following brief introduction: *We'd like to get your impressions of a study. Please read the description of the study on the next page carefully before responding to the question about the study.*

### Abortion Condition

A city government is trying to decide whether to pass a law restricting access to abortions. Government officials are unsure whether the law will increase the number of abortion-related maternal deaths by expanding the number of women who get unsafe abortions outside of a doctor's office, or decrease the number of abortion-related maternal deaths by limiting the number of women in the city who get abortions.

To answer this question, researchers completed a study that compared changes in the number of abortion-related maternal deaths between cities that did or did not restrict access to abortions.

The number of cities in which abortion-related maternal deaths increased and decreased in each group are recorded in the table below. The exact number of cities in each group is not the same, but this does not prevent assessment of the results.

	Decrease in abortion-related maternal deaths	Increase in abortion-related maternal deaths
Cities that <u>did</u> restrict access to abortions	223	75
Cities that <u>did not</u> restrict access to abortions	107	21

Which of the following statements about this study is true?

- ☐ Cities that restricted access to abortions were more likely to have a decrease in abortion-related maternal deaths than cities without restrictions.
- ☐ Cities that restricted access to abortions were more likely to have an increase in abortion-related maternal deaths than cities without restrictions.

### Immigration Condition

A city government is trying to decide whether to become a "sanctuary city" by passing a law protecting immigrants from being detained by federal law enforcement agents. Government officials are unsure whether the law will increase the crime rate by attracting more immigrants or decrease the crime rate by allowing immigrants to report crime without fear of being deported.

To answer this question, researchers completed a study that compared changes in crime rates between cities that did or did not pass laws protecting immigrants.

The number of cities in which the crime rate increased and decreased in each group are recorded in the table below. The exact number of cities in each group is not the same, but this does not prevent assessment of the results.

	Increase in crime rate	Decrease in crime rate
Sanctuary Cities	223	75
Non-Sanctuary Cities	107	21

**Which of the following statements about this study is true?**

- ☐ Sanctuary cities were more likely to have a decrease in crime than non-sanctuary cities.
- ☐ Sanctuary cities were more likely to have an increase in crime than non-sanctuary cities.

### Affirmative Action Condition

A university is trying to decide whether to adopt affirmative action policies that give preference to racial minorities applying for admission. University officials are unsure whether affirmative action policies increase minority students' social experience by creating a more diverse and inclusive community, or decrease minority students' social experience by creating hostility toward minority students.

To answer this question, researchers completed a study that compared changes in minority students' satisfaction with college social life between universities that did or did not adopt affirmative action policies.

The number of universities for which satisfaction with social life increased and decreased in each group are recorded in the table below. The exact number of universities in each group is not the same, but this does not prevent assessment of the results.

	Increase in satisfaction with social life	Decrease in satisfaction with social life
Universities that <u>did</u> adopt affirmative action	223	75
Universities that <u>did not</u> adopt affirmative action	107	21

Which of the following statements about this study is true?

- ☐ Universities that adopted affirmative action policies were more likely to have a decrease in social life satisfaction than universities that did not adopt affirmative action policies.
- ☐ Universities that adopted affirmative action policies were more likely to have an increase in social life satisfaction than universities that did not adopt affirmative action policies.



### Minimum Wage Condition

A state government is trying to decide whether to pass a law raising the minimum wage to \$15 an hour. Government officials are unsure whether the law will increase unemployment by reducing the number of employees companies can afford to pay or decrease unemployment by stimulating the economy and creating new jobs.

To answer this question, researchers completed a study that compared changes in unemployment rates between cities that did or did not raise the minimum wage.

The number of cities for which the unemployment rate increased and decreased in each group are recorded in the table below. The exact number of cities in each group is not the same, but this does not prevent assessment of the results.

	Increase in unemployment rate	Decrease in unemployment rate
Cities that <u>did</u> raise the minimum wage	223	75
Cities that <u>did not</u> raise the minimum wage	107	21

Which of the following statements about this study is true?

- ☐ Cities that raised the minimum wage were more likely to have an increase in unemployment than cities that did not raise the minimum wage.
- ☐ Cities that raised the minimum wage were more likely to have a decrease in unemployment than cities that did not raise the minimum wage.

### Gun Control Condition

A city government is trying to decide whether to pass a law banning private citizens from carrying concealed handguns in public. Government officials are unsure whether the law will increase crime by making it harder for law-abiding citizens to defend themselves against violent criminals or decrease crime by limiting the number of people carrying weapons.

To answer this question, researchers completed a study that compared changes in crime rates between cities that did or did not ban concealed handguns.

The number of cities for which the crime rate increased and decreased in each group are recorded in the table below. The exact number of cities in each group is not the same, but this does not prevent assessment of the results.

	Increase in crime rate	Decrease in crime rate
Cities that <u>did</u> ban concealed handguns	223	75
Cities that <u>did not</u> ban concealed handguns	107	21

Which of the following statements about this study is true?

- ☐ Cities that enacted a ban on carrying concealed handguns were more likely to have an increase in crime than cities without bans.
- ☐ Cities that enacted a ban on carrying concealed handguns were more likely to have a decrease in crime than cities without bans.

## Experiment 2 (Study Quality Judgments) Vignettes

Respondents were again randomly assigned to received evidence about one of the four issues that they did not receive information about in the first experiment (either a concealed handgun ban, a minimum wage increase, affirmative action, sanctuary cities, or abortion). Respondents were again randomized to receive evidence that supported the liberal or conservative position on the assigned issue. Experiment 2 was preceded by the following brief instructions: *Here's one more recent study. Please read the information carefully and answer questions about the design of the study.*

### Gun Control Condition

**Study Description:** Researchers recently ran a study that found that bans on carrying concealed handguns lead to an increase [a decrease] in crime. The study compared changes in the crime rate in 25 cities that banned carrying concealed handguns and 25 cities that did not. Researchers found that the crime rate increased [decreased] by 70% more in cities that banned concealed handguns, compared to those that did not.

**Sample Size Outcome:** We're interested in your thoughts about the design of this study. Researchers always need to balance costs and benefits when designing a study. Using a larger sample of cities allows for stronger conclusions, but also makes the study more expensive. Do you think a sample of 50 cities is smaller than necessary, larger than necessary, or about the right size to determine whether banning concealed handguns leads to changes in the crime rate? (Much larger than necessary, Somewhat larger than necessary, A bit larger than necessary, About the right size, A bit smaller than necessary, Somewhat smaller than necessary, Much smaller than necessary)

**Causal Claim Outcome:** Sometimes, one thing causes another. For example, the summer heat causes people to eat more ice cream. But sometimes two things are only related to each another, because they are both caused by the same thing. For example, eating ice cream and wearing shorts are only related to each another, because they are both caused by the summer heat (eating ice cream does not cause you to wear shorts). How much do you agree or disagree with the following statement? "This study provides at least some evidence that banning concealed handguns causes changes in the crime rate." (Disagree strongly, Disagree somewhat, Disagree a little, Neither agree nor disagree, Agree a little, Agree somewhat, Agree strongly)

### Minimum Wage Condition

**Study Description:** Researchers recently ran a study that found that raising the minimum wage leads to an increase [a decrease] in unemployment. The study compared changes in unemployment rates in 25 cities that raised the minimum wage and 25 cities that did not. Researchers found that unemployment increased [decreased] by 70% more in cities that raised the minimum wage, compared to those that did not.

**Sample Size Outcome** We're interested in your thoughts about the design of this study. Researchers always need to balance costs and benefits when designing a study. Using

a larger sample of cities allows for stronger conclusions, but also makes the study more expensive. Do you think a sample of 50 cities is smaller than necessary, larger than necessary, or about the right size to determine whether raising the minimum wage leads to changes in the unemployment rate?

**Causal Claim Outcome** Sometimes, one thing causes another. For example, the summer heat causes people to eat more ice cream. But sometimes two things are only related to each another, because they are both caused by the same thing. For example, eating ice cream and wearing shorts are only related to each another, because they are both caused by the summer heat (eating ice cream does not cause you to wear shorts). How much do you agree or disagree with the following statement? “This study provides at least some evidence that raising the minimum wage causes changes in the unemployment rate.”

### **Affirmative Action Condition**

**Study Description:** Researchers recently ran a study that found that affirmative action policies lead to an increase [a decrease] in satisfaction with campus social life. The study compared changes in satisfaction with campus social life in 25 universities that adopted affirmative action policies and 25 universities that did not. Researchers found that satisfaction with campus social life increased [decreased] by 70% more at universities that adopted affirmative actions policies, compared to those that did not.

**Sample Size Outcome:** We’re interested in your thoughts about the design of this study. Researchers always need to balance costs and benefits when designing a study. Using a larger sample of universities allows for stronger conclusions, but also makes the study more expensive. Do you think a sample of 50 universities is smaller than necessary, larger than necessary, or about the right size to determine whether adopting affirmative action policies leads to changes in satisfaction with campus social life?

**Causal Claim Outcome** Sometimes, one thing causes another. For example, the summer heat causes people to eat more ice cream. But sometimes two things are only related to each another, because they are both caused by the same thing. For example, eating ice cream and wearing shorts are only related to each another, because they are both caused by the summer heat (eating ice cream does not cause you to wear shorts). How much do you agree or disagree with the following statement? “This study provides at least some evidence that adopting affirmative action policies causes changes in satisfaction with campus social life.”

### **Immigration Condition**

**Study Description:** Researchers recently ran a study that found that protecting immigrants from being detained by federal law enforcement agencies leads to an increase [a decrease] in crime. The study compared changes in the crime rate in 25 cities that passed laws protecting immigrants from being detained (so called “sanctuary cities”) and 25 cities that did not. Researchers found that the crime rate increased [decreased]

by 70% more in cities that passed laws protecting immigrants, compared to those that did not.

**Sample Size Outcome** We're interested in your thoughts about the design of this study. Researchers always need to balance costs and benefits when designing a study. Using a larger sample of cities allows for stronger conclusions, but also makes the study more expensive. Do you think a sample of 50 cities is smaller than necessary, larger than necessary, or about the right size to determine whether protecting immigrants from being detained leads to changes in the crime rate?

**Causal Claim Outcome** Sometimes, one thing causes another. For example, the summer heat causes people to eat more ice cream. But sometimes two things are only related to each another, because they are both caused by the same thing. For example, eating ice cream and wearing shorts are only related to each another, because they are both caused by the summer heat (eating ice cream does not cause you to wear shorts). How much do you agree or disagree with the following statement? "This study provides at least some evidence that protecting immigrants from being detained causes changes in the crime rate."

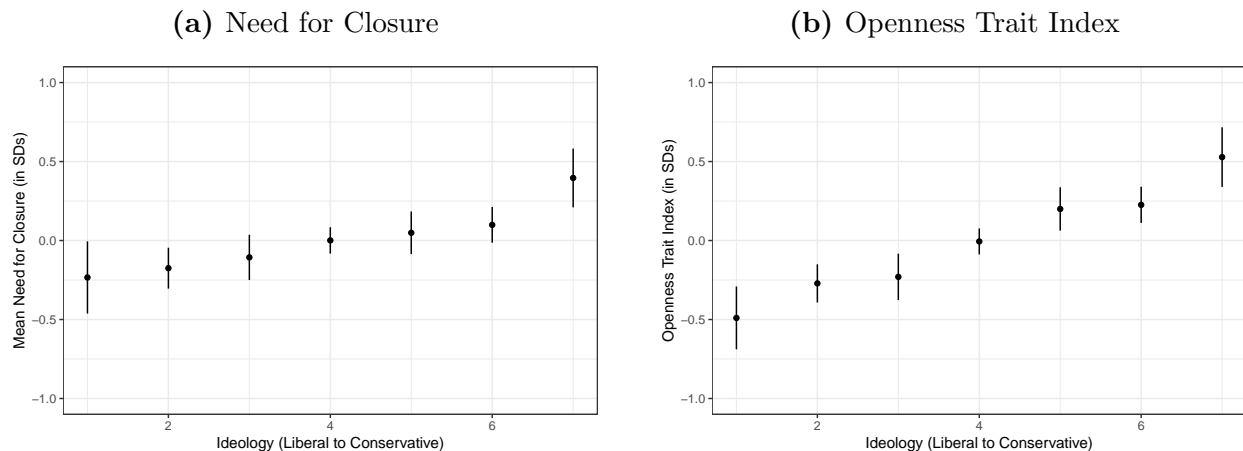
## **Abortion Condition**

**Study Description:** Researchers recently ran a study that found that restricting access to abortions leads to an increase [a decrease] in abortion-related maternal deaths. The study compared changes in the number of abortion-related maternal deaths in 25 cities that restricted access to abortions and 25 cities that did not. Researchers found that the number of abortion-related maternal deaths increased [decreased] by 70% more in cities that restricted access to abortions, compared to those that did not.

**Sample Size Outcome** We're interested in your thoughts about the design of this study. Researchers always need to balance costs and benefits when designing a study. Using a larger sample of cities allows for stronger conclusions, but also makes the study more expensive. Do you think a sample of 50 cities is smaller than necessary, larger than necessary, or about the right size to determine whether restricting access to abortions leads to changes in the number of abortion-related maternal deaths?

**Causal Claim Outcome** Sometimes, one thing causes another. For example, the summer heat causes people to eat more ice cream. But sometimes two things are only related to each another, because they are both caused by the same thing. For example, eating ice cream and wearing shorts are only related to each another, because they are both caused by the summer heat (eating ice cream does not cause you to wear shorts). How much do you agree or disagree with the following statement? "This study provides at least some evidence that restricting access to abortions causes changes in abortion-related maternal deaths."

## Differences in Need for Closure and Openness by Ideology



**Figure 6:** Mean differences in Need for Closure and Openness Trait Index across all levels of ideology, from extremely liberal to extremely conservative.

## PMR Asymmetries with Continuous Ideology Measure

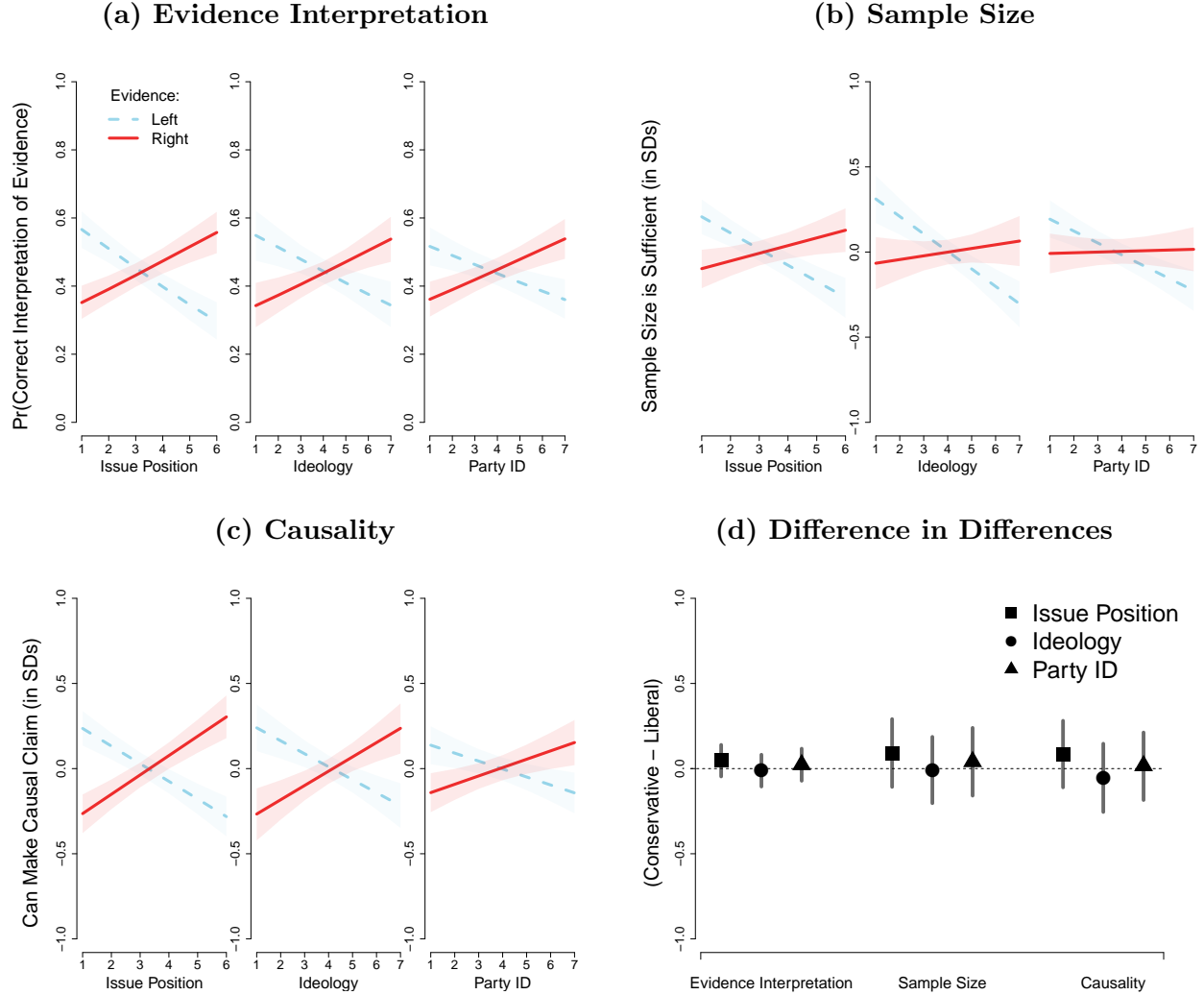
While in the main analysis presented in the manuscript uses a dichotomous measure of issue positions, party identification, and ideology to represent participants' left-right orientation, an alternative approach is to use a continuous measure that allows for heterogeneity within each of the two groups. In this section we present the results from models run with nearly identical specifications as those presented in the main text, but with continuous measures of each operationalization of left-right orientation.

Since the largest differences between conditions occur at the extreme ends of respondents' left-right political orientation (e.g., where issue position is equal to 1 and 6), one very conservative test of ideological asymmetries is to compare the difference between interpretation of left-leaning and right-leaning evidence at these extremes. We subtracted the difference between conditions in predicted levels of the outcome variable for respondents at the *right-most extreme* of political orientation from difference between conditions for respondents at the *left-most extreme* of political orientation. Positive values of this difference in differences indicate that the most right-leaning respondents were more likely to engage in motivated reasoning than the most left-leaning respondents, while negative values indicate the opposite and a value of zero indicates no differences in PMR across ideology. We plot these differences, along with their associated 95% confidence intervals, below.

Results from Study 1 replicate the analysis with binary measures of respondents' left-right orientation presented in the manuscript. In Study 2 we find that for both the sample size and causality outcomes respondents who have extremely conservative positions on the issue being evaluated are more likely to engage in PMR than those with extremely liberal positions. We observe no significant differences in PMR between extreme liberals and conservatives, or between strong Democrats and Republicans.

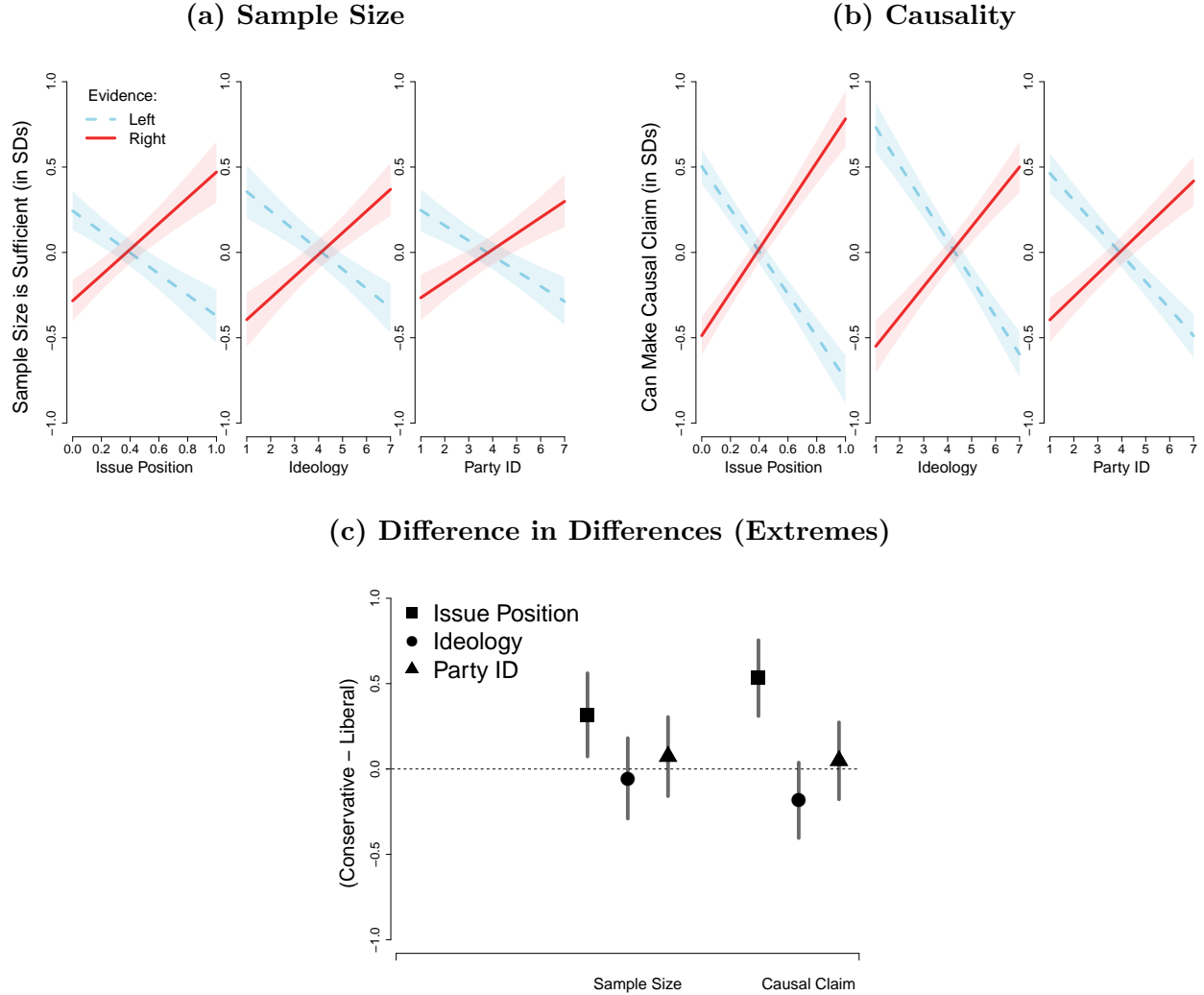
## Replication with Continuous Left-Right Measure

### Lucid Study



**Figure 7:** Predicted levels of each experimental outcome by experimental condition (left-leaning or right-leaning information) plotted across levels of respondents' left-right orientation (horizontal axis). For each outcome we plot predictions separately for each operationalization of left-right orientation (ideology, issue position, and party identification). The bottom-right panel displays the difference between how respondents with the most liberal and conservative orientation evaluate left-leaning and right-leaning evidence. Positive values of these differences indicate that right-leaning respondents are more likely to engage in PMR.

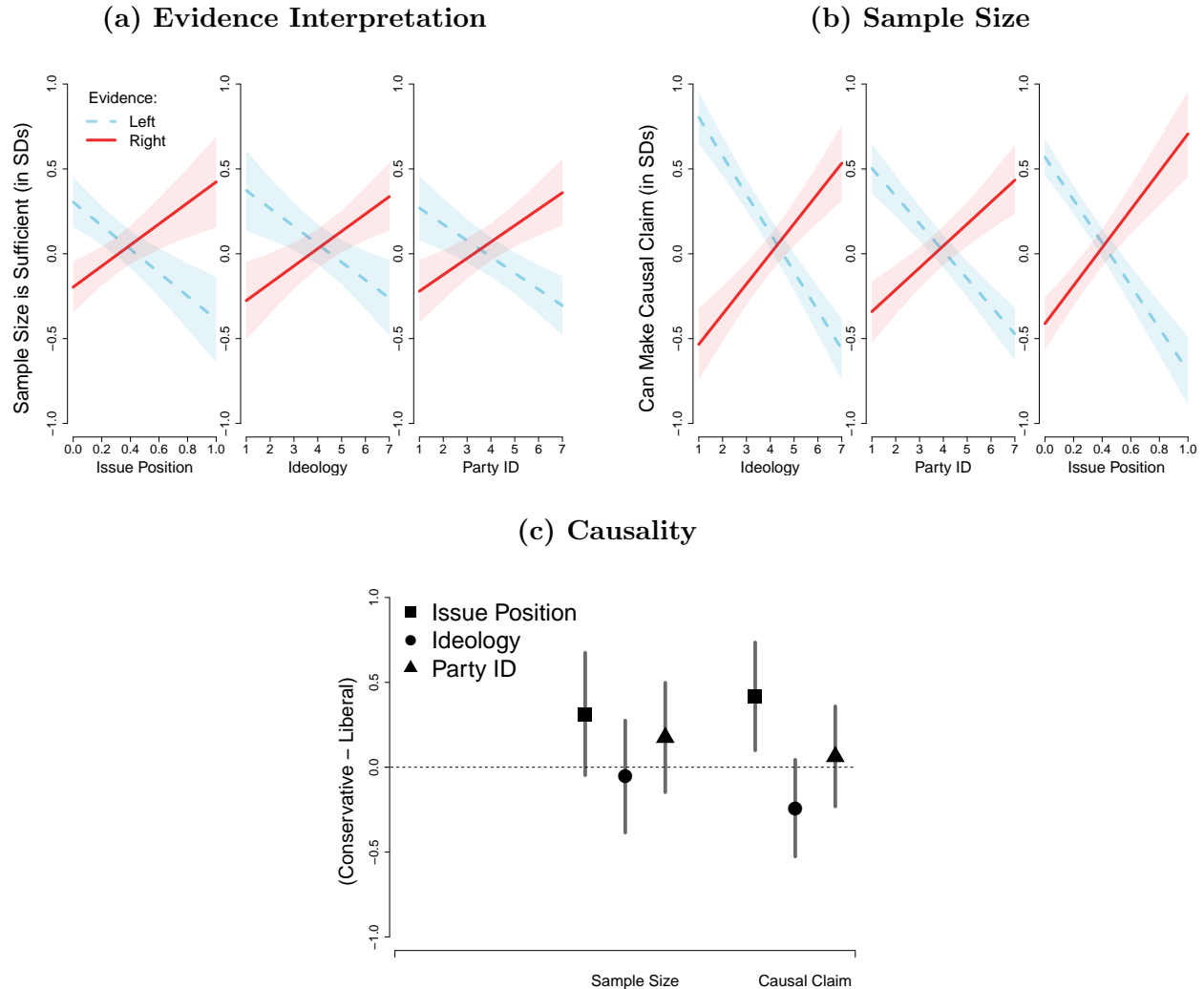
**Replication with Continuous Left-Right Measure:  
CCES Study (Unmatched, Unweighted)**



**Figure 8:** Predicted levels of each experimental outcome by experimental condition (left-leaning or right-leaning information) plotted across levels of respondents' left-right orientation (horizontal axis). For each outcome we plot predictions separately for each operationalization of left-right orientation (ideology, issue position, and party identification). The bottom-right panel displays the difference between how respondents with the most liberal and conservative orientation evaluate left-leaning and right-leaning evidence. Positive values of these differences indicate that right-leaning respondents are more likely to engage in PMR.

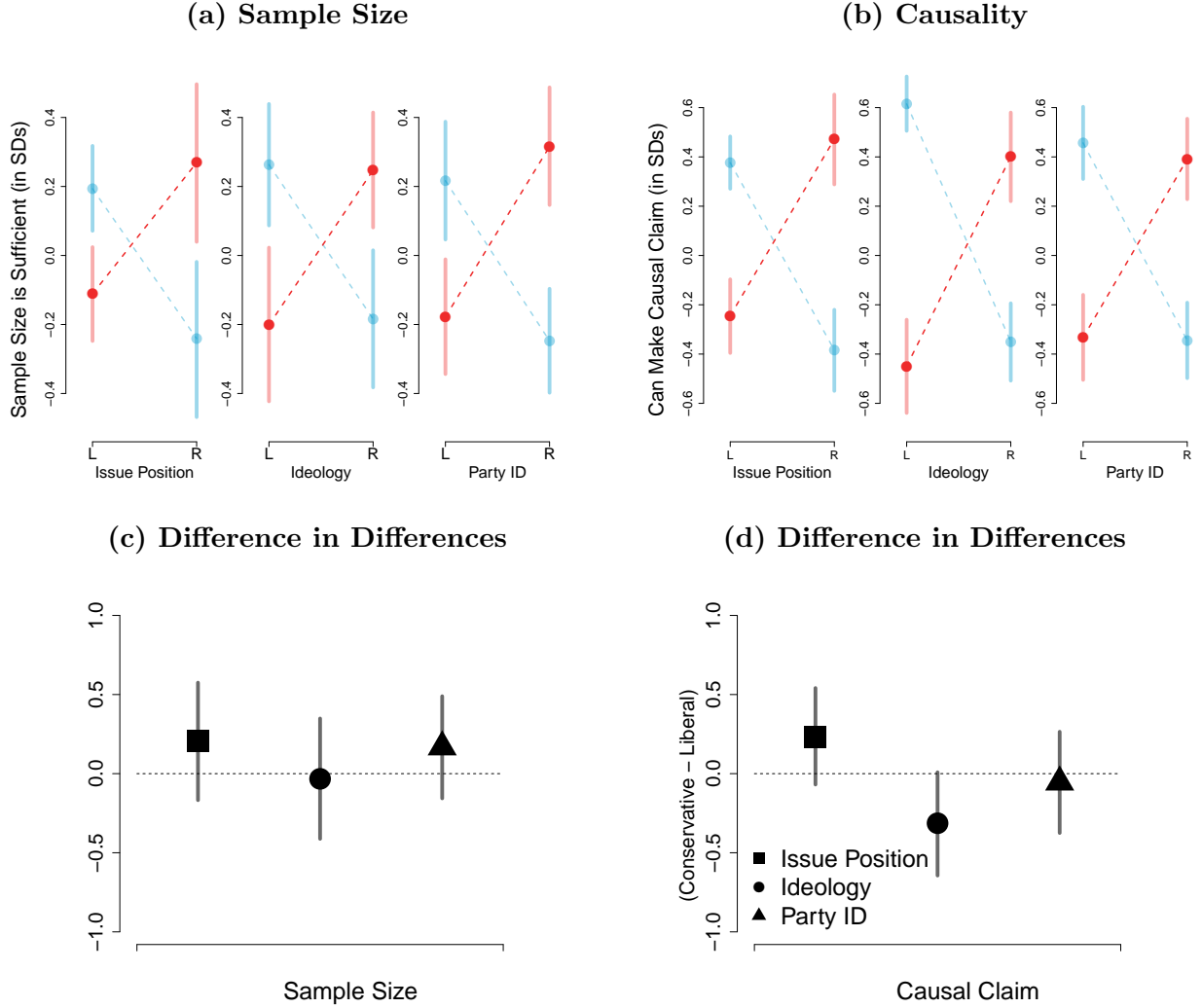


**Replication with Continuous Ideology Measure:  
CCES Study (Matched, Weighted)**



**Figure 9:** Predicted levels of each experimental outcome by experimental condition (left-leaning or right-leaning information) plotted across levels of respondents' left-right orientation (horizontal axis). For each outcome we plot predictions separately for each operationalization of left-right orientation (ideology, issue position, and party identification). The bottom-right panel displays the difference between how respondents with the most liberal and conservative orientation evaluate left-leaning and right-leaning evidence. Positive values of these differences indicate that right-leaning respondents are more likely to engage in PMR.

## Matched (Weighted) CCES Results



**Figure 10:** Replication of Experiment 2 using the matched 2018 Cooperative Congressional Election Study dataset with weights.

In the main text of the manuscript we report difference-in-differences for the unmatched CCES results. Here, for completeness, we report the same analysis with the matched weighted sample.

### 3-Way Interactions: Congeniality, Expertise, and Identity Centrality

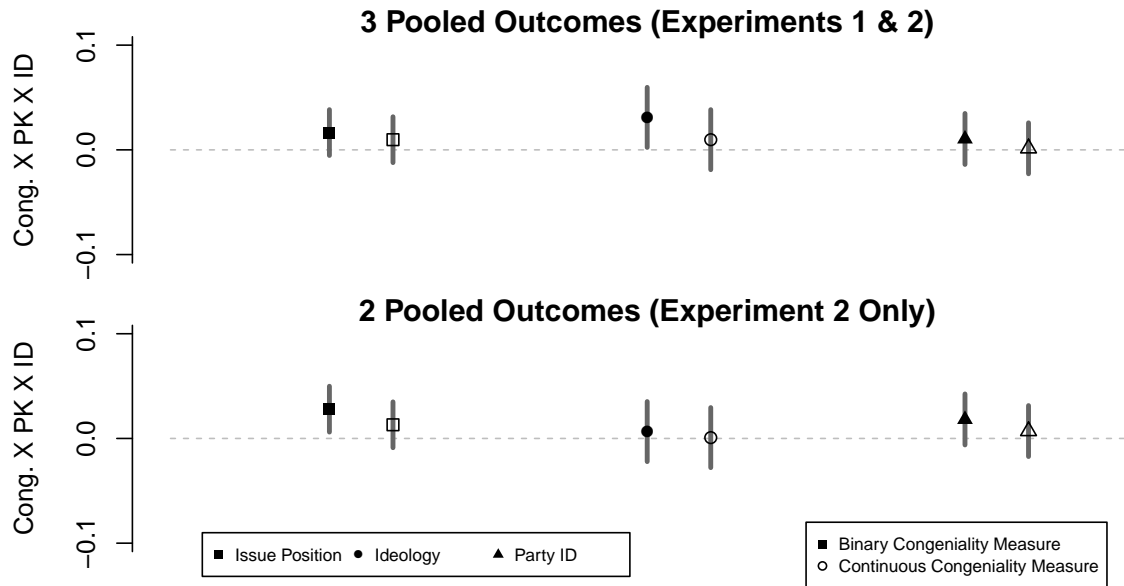
It is possible that political identity centrality matters primarily among political experts. That is, PMR is evident primarily among citizens with *both* the motivation *and* the ability to counter-argue new information (this hypothesis would also apply to the effect of epistemic needs). While concerns with power prevent us from testing this three-way interaction in our main analysis, we pooled our data across experiments as an initial post-hoc test of this

relationship.

We carried out two sets of analyses with different pooling strategies. In both we pool only across experiments in Study 1 (the Lucid sample), given that Study 2 was intended to replicate the asymmetry result of Study 1 and does not feature adequate measures of political identity. In the first, we pool across both experiments (all three outcomes: evidence interpretation, sample size, and causality) in Study 1. This pooling approach results in the largest number of observations: 5,448 observations from 1,816 unique individuals. However, since the evidence interpretation outcome in Experiment 1 is measured on a binary scale and both outcomes in Experiment 2 are measured on 7-point scales, this pooling approach required us to use OLS on binary outcomes. Our second set of analyses avoids this issue by pooling only the outcomes from Experiment 2 (both measured on 7-point scales), but results in fewer observations (3,632 observations from 1,816 unique individuals). We present the results from both analyses below. In both we use clustered standard errors to account for clustered structure of the observations within individuals. We follow the same modeling approach as we did in the models examining the moderating roles of expertise and identity centrality in the manuscript, including running models separately for binary and continuous measures of congeniality. As in our main models, we operationalize needs for epistemic closure with both Need for Cognition and the broader openness trait index.

The results suggest a relationship in the expected direction, but are inconsistent and statistically insignificant at the .05 threshold in all but three cases. When pooling across all three outcomes (top panel), we find three-way interactions that are positive but statistically indistinguishable from zero in all but one case (using a .05 significance threshold). We observe similar patterns when pooling across only outcomes in Experiment 2 (bottom panel). These results are somewhat suggestive that PMR occurs primarily among citizens with both the motivation and ability to counter-argue new information, but further research is clearly required. While the size of the interaction coefficients are small and often statistically indistinguishable from zero, the consistent positive direction of the coefficients is suggestive of a relationship between motivated reasoning, expertise, and identity centrality and warrants further attention in future work.

## Results from Models with Three-Way Interactions



**Figure 11:** Three-way interactions between congruency, political knowledge, and identity using data pooled across all three outcomes in Study 1 (top panel) and the two outcomes from the second experiment in Study 1 (bottom panel). We run separate models in which congruency is operationalized as binary or continuous. All outcomes are coded to range from 0 to 1. Political knowledge, identity, and the continuous measure of congruency are similarly standardized to have a mean of zero and standard deviation of 1. Vertical lines represent 95% confidence intervals around the coefficient estimates.