

Thinking clearly about causal inferences of politically motivated reasoning: why paradigmatic study designs often undermine causal inference

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A common inference in behavioral science is that people's motivation to reach a politically congenial conclusion causally affects their reasoning—known as politically motivated reasoning. Often these inferences are made on the basis of data from randomized experiments that use one of two paradigmatic designs: *Outcome Switching*, in which identical methods are described as reaching politically congenial versus uncongenial conclusions; or *Party Cues*, in which identical information is described as being endorsed by politically congenial versus uncongenial sources. Here we argue that these designs often undermine causal inferences of politically motivated reasoning because treatment assignment violates the excludability assumption. Specifically, assignment to treatment alters variables alongside political motivation that affect reasoning outcomes, rendering the designs confounded. We conclude that distinguishing politically motivated reasoning from these confounds is important both for scientific understanding and for developing effective interventions; and we highlight those designs better placed to causally identify politically motivated reasoning.

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The concept of politically motivated reasoning is likely familiar to most behavioral scientists. While precise definition of the concept has proved elusive [1], the common working conception is that it is a mode of reasoning in which the person's goal is to reach a particular, *politically congenial* conclusion when reasoning [1–3,4^{••},5].

Accordingly, politically motivated reasoning is considered a subset of the phenomenon of 'directional' motivated reasoning, in which the person's goal is to reach a particular conclusion, political or otherwise [6]⁴. Like its directional superset, politically motivated reasoning is typically contrasted with a motivation for accuracy when reasoning; thus, to engage in politically motivated reasoning is to forsake or otherwise diminish the motivation to be accurate.

Research emphasizes various incentives that motivate people to reach politically congenial conclusions when reasoning: From psychological incentives—such as defending their existing political beliefs to avoid cognitive dissonance—to material incentives, such as signaling coalitional allegiance to safeguard their standing in social relationships that confer material benefits [4^{••},5,8[•],9,10]. Despite these differences in emphasis, however, the core assumption is the same: Politically motivated reasoners are motivated to reach one political conclusion over another, and this causes reasoning to be performed in such a way that is (i) different, and (ii) worse for accuracy, than if the motivation were absent.

Causal inferences of politically motivated reasoning

Causal inferences of politically motivated reasoning are widespread in behavioral science. These inferences are most often made on the basis of data from randomized experiments. The outcome variables used in these experiments are diverse, but, generally speaking, include either (i) people's evaluations or endorsements of new information—for example, the extent to which they evaluate new information as high or low quality—or (ii) belief updating—the extent to which the information changes their relevant beliefs. Both of these outcome variables plausibly capture processes that could be described as 'reasoning'.

In this paper, however, we focus on experiment designs that use the former type of outcome variable—for two reasons. First, this outcome variable appears to be the more commonly studied. For example, in a recent meta-analysis, Ditto *et al.* [11^{••}] identify 51 experiments spanning 40 years of research using this outcome variable. Though we lack a precise estimate of the number of

⁴ But see Ditto [7] for an alternative conception.

counterpart experiments that use belief updating as the outcome, our impression is that it is less common. Second, and perhaps explaining the previous point, the evaluations outcome variable is argued to provide clearer evidence of politically motivated reasoning than the belief updating outcome variable [4^{••},8[•],11^{••}] because of the difficulty in establishing a clear benchmark for what politically *unmotivated* belief updating should look like [4^{••},12].

The recent meta-analysis of Ditto *et al.* [11^{••}] highlights two paradigmatic study designs that use the evaluations outcome variable. We refer to these study designs as *Outcome Switching* and *Party Cues* designs. These designs are paradigmatic insofar as they appear repeatedly in the research literature [11^{••}], and, as described above, are argued to provide some of the clearest evidence of politically motivated reasoning [4^{••},8[•]]. We describe the typical structure of these designs below.

Outcome switching

In this design, subjects are randomly assigned to receive one of two pieces of information; where the substantive detail of the information is held constant across conditions, but its implication for subjects' political identities or preferences is varied *between* conditions. The key result is that subjects' evaluation of the information differs by condition, and, in particular, that this difference is correlated with their political identities or preferences. Specifically, people evaluate the information less favorably when it is discordant with their political identities or preferences than when it is concordant with their political identities or preferences.

To illustrate, in one study U.S. subjects were asked to evaluate the validity of a test of 'open-minded and reflective' thinking [13]. Before providing their evaluations, subjects completed the test themselves and were randomly assigned to one of two treatments (or control) in which they were provided information about the test. In treatment A, subjects were told that people who believe that climate change is happening tend to score higher on the test than people who are skeptical that climate change is happening; implying the former are more open-minded. In treatment B, they were told the reverse: that people who are skeptical that climate change is happening tend to score higher in the test, implying *they* are more open-minded. Subjects who identified on the political left rated the test as more valid in treatment A than B; and *vice versa* for subjects who identified on the political right.

Party cues

In this design, subjects are typically asked to give their opinion about a new policy—usually, the extent to which they support or oppose it. Before giving their opinion, they are randomly assigned to a treatment in which they are told which party endorses the policy, or to a control

group in which they receive no party endorsement. The key result is that subjects are most likely to endorse (oppose) the policy if their party (the opposition party) endorses it. To illustrate, in one study US subjects were asked for their opinion about a new welfare policy [14]. The randomization of party cue consisted in subjects being informed either that the Democratic Party favored the policy and Republicans opposed, or that the Republican Party favored the policy and Democrats opposed. The key result was that self-identified liberals were more likely to support the policy in the former treatment, and *vice versa* for self-identified conservatives.

There exists much debate over whether such results provide evidence of politically motivated reasoning, or, instead, show that people use party endorsements as 'cognitive shortcuts' to help them form appropriate policy opinions [1,10,15–20]. However, a number of recent studies suggest that politically motivated reasoning is the more plausible of these two causal mechanisms, on the basis of several kinds of results. In particular, party cue effects are larger among those who know about and engage with politics [20] (but see e.g. [19,21]); among those with a combination of strong party attachment and high cognitive ability [15]; and in contexts where elite partisan polarization is more salient [16,17,20]. These results appear difficult to reconcile with a cognitive shortcut mechanism.

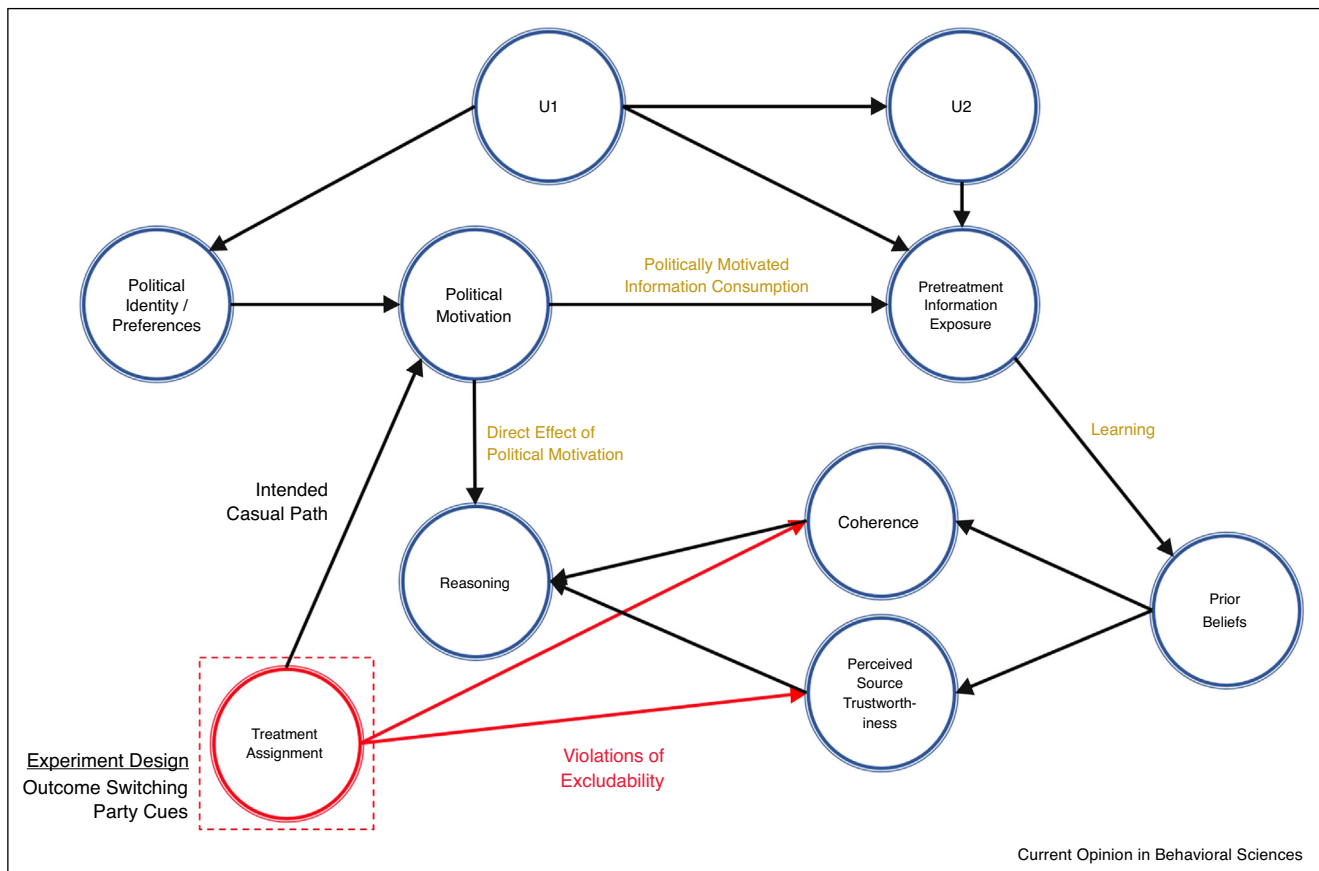
Why paradigmatic designs undermine causal inference

In this section, we outline why the paradigmatic study designs often undermine causal inferences of politically motivated reasoning. In particular, we organize various arguments made elsewhere about why these designs are often confounded, and we trace these arguments with respect to a single analytic framework.

The treatment in the paradigmatic designs consists in randomly assigning subjects to receive different information, as per the aforementioned examples, and recording reasoning outcomes in the form of their beliefs, attitudes, or opinions. Accordingly, causal inferences of politically motivated reasoning that are often made on the basis of these designs assume that the information treatment affects people's reasoning only insofar as it affects their political motivation. That is, the effect of the information treatment on outcomes (beliefs, attitudes, or opinions) is exclusively *mediated* by the motivation to reach a politically congenial conclusion.

This assumption is represented in the Directed Acyclic Graph (DAG) in Figure 1 (Intended Causal Path). DAGs provide a framework for reasoning about causal relationships between variables of interest [22,23,24[•]]. Causal inference along the Intended Causal Path in Figure 1 relies on the assumption of excludability. Excludability is a core

Figure 1



Directed Acyclic Graph of politically motivated reasoning in randomized experiment designs, showing violations of the excludability assumption. Nodes represent variables of interest and edges represent causal relationships (arrows indicate the direction of influence). $U1$ denotes unobserved variables that influence both political identity/preferences and pretreatment information exposure (e.g. family environment, early life experiences, social network, etc.). $U2$ denotes unobserved variables that influence pretreatment information exposure only (e.g. what information sources people find trustworthy and credible).

assumption of inference in experiments, and states that random assignment to treatment affects the outcome only through the variable of interest [25]. Thus, when the excludability assumption is satisfied, the estimated treatment effect is attributable to the variable of interest—in the case of Figure 1, to the motivation to reach a politically congenial conclusion.

However, both of the paradigmatic designs often violate the excludability assumption. In particular, the information treatment delivered in both the *Outcome Switching* and *Party Cues* design affects not only political motivation, but, in addition, distinct variables that interact with people's Prior Beliefs (Figure 1) to affect their reasoning outcomes. Consequently, the designs undermine causal identification of politically motivated reasoning.

Previous work has described violations of the excludability assumption in the *Outcome Switching* design, albeit using different terminology [1,26,27,28–31]. The excludability

violation in this design occurs because people's political identities and preferences are often correlated with their prior beliefs about the specific issue at hand. For example, self-identified liberals and conservatives may be motivated to see the other group as closed-minded, but they may also sincerely believe the other group is closed-minded—with beliefs being formed via Pretreatment Information Exposure (Figure 1).

The implication of this covariance between prior beliefs on the one hand, and political identities and preferences on the other, is that 'switching' the outcome of the treatment information to render it discordant with political identities and preferences *also* renders it discordant with prior beliefs. This violates the excludability assumption because people's reasoning can be affected by the coherence between new information and their prior beliefs in the absence of political motivation. In other words, the effect of prior beliefs (via coherence) confounds inferences of political motivation in this design.

This is illustrated by studies that find that prior beliefs affect reasoning in contexts where a directional motivation (political or otherwise) is absent. For example, Koehler [32] randomly assigned subjects to read two scientific studies in which the results either supported or refuted a fictitious and innocuous hypothesis. Before reading about the studies, subjects were randomly assigned separate information about whether the hypothesis was true or not, experimentally inducing their prior beliefs one way or the other. The results showed that subjects tended to evaluate the studies as worse if the results disagreed (versus agreed) with their induced prior beliefs. Converging evidence comes from numerous studies documenting ‘belief bias,’ in which people’s reasoning about the validity of arguments is influenced by the coherence between the conclusion and their prior beliefs [33–36]. In these studies, the arguments are often similarly innocuous.

Complementing these empirical data, Bayes’ rule illustrates that, when there is uncertainty over the reliability of an information source, the discrepancy between information from that source and one’s prior beliefs *should* inform one’s assessment of the reliability of the source [26*,32,37,38]. This is intuitive: If one is uncertain about the reliability of a source, observing that a piece of information from that source contradicts what one currently believes to be true increases the probability that the source is unreliable.

In summary, the information treatment provided in the *Outcome Switching* design often violates the excludability assumption by altering coherence with prior beliefs, which normatively (Bayesian inference) and demonstrably (empirical data) affects reasoning outcomes independent of political motivation. Consequently, this design undermines causal identification of political motivation. While political motivation may influence relevant prior beliefs before the study begins—for example, by shaping information consumption behavior [5]—and thereby influence reasoning *indirectly* (via coherence), it is an implausibly strong assumption that Pretreatment Information Exposure is entirely determined by political motivation. Indeed, as the DAG shows, the effect of prior beliefs (via coherence) is not strictly a mediator for political motivation. Rather, the correlation between the two variables is plausibly due to unobserved confounders ($U1$ and $U2$), meaning that an effect of prior beliefs cannot simply be interpreted as transmitting an effect of political motivation.

Turning to the *Party Cues* design, while the key result therein is consistent with the Intended Causal Path (Figure 1), it too is confounded by an excludability violation. Specifically, party cues signify endorsement by a source that is either perceived as trustworthy and aligned with one’s interests (same party cue), or as

untrustworthy and opposed to one’s interests (opposition party cue). Thus, the information treatment alters perceived source trustworthiness. As Lupia and McCubbins [39] argue, ‘concepts such as reputation, party, or ideology are useful heuristics only if they convey information about knowledge and trust . . . knowledge and trust are the fundamental factors that make cues persuasive’ (p. 11). In other words, it is plausible that perceived source trustworthiness underpins receptivity to party cues; and, importantly, accounting for source trustworthiness is a general feature of reasoning that does not entail political motivation [40**]. For example, studies indicate that people are more persuaded by trusted than untrusted sources in various domains unrelated to politics, such as consumer advertising [41].

In addition, trustworthiness is identified as a fundamental trait in social cognition [42,43], ostensibly because moral traits (or lack thereof) in other people can bear strongly on the interests of the perceiver [44]. Consequently, one might expect reasoners to be sensitive to the perceived trustworthiness of sources in general, and particularly so in domains characterized by competing interests and where accusations of untrustworthiness are common (politics).

Furthermore, there is empirical evidence that receptivity to party cues operates through the mechanism of perceived source trustworthiness. Bolsen *et al.* [16] measured subjects’ trust in their party before the delivery of their party cues treatment. They observed an ‘enormous moderating effect of trust’ on the party cue treatment effect (p. 258). They interpret this result as showing that party trust moderates politically motivated reasoning. While this could be the case, the result could also indicate that subjects were conditioning on perceived source trustworthiness *per se*, not striving for a politically congenial conclusion [40**]. In other words, consistent with the argument thus far, the evidence is rather undiagnostic.

Violation of excludability via source trustworthiness can also accommodate the aforementioned results that challenge the ‘cognitive shortcut’ explanation of party cue effects. For example, it is plausible that people who follow politics have more precise perceptions of the trustworthiness of their own party versus the opposing party, explaining why they show larger party cue effects. The same argument applies for those who have a strong party attachment and high cognitive ability—given that the former is naturally confounded with party trust, while the latter correlates with greater interest and engagement in politics [45] and stronger political opinions [46]. Finally, contexts which are more politicized and where elite partisan polarization is more salient plausibly provide a stronger cue to trust one’s own party and distrust the opposition party [40**].

In summary, the information treatment delivered in the *Party Cues* design violates the excludability assumption by altering perceived source trustworthiness, a variable that demonstrably affects reasoning outcomes in the absence of political motivation. Consequently, this design undermines causal identification of politically motivated reasoning.

Implications and conclusion

The implication of our analysis is that paradigmatic study designs—dubbed here *Outcome Switching* and *Party Cues*—are often inadequate for causally identifying politically motivated reasoning. The broad logic underlying this problem is not new (see e.g. [6,29,47]), but we have sought to emphasize, unify, and clearly explicate it under a common framework. We see two main questions that follow our analysis:

- (1) Does causal identification of political motivation matter?
- (2) What designs can better identify causal effects of political motivation?

Regarding question (1), if society's goal is to reduce partisan disagreement over political questions—for example, whether policy X is effective—or to reduce deference to party cues over such questions, the answer is *Yes*. A clear understanding of the causes of said disagreement and deference is important for designing interventions that achieve the desired goal. While sometimes the same intervention might reasonably be expected to yield similar outcomes under alternative causal theories ([48]; see also Ref. [49]), this is not the case for many interventions that might be considered.

For example, on the assumption that political opinion on certain issues is dominated by politically motivated reasoning, simply communicating richer and more accurate information about those issues is unlikely to change minds. Thus, society might direct less resources toward, or largely abandon, such information interventions. In contrast, on the assumption that heterogeneous prior information causes the differing opinions, information interventions seem a relatively safer bet for changing minds. Since studies suggest that such interventions *can* change people's minds [50,51*,52], the question becomes 'how much' should society weight each of these two channels—politically motivated reasoning versus heterogeneous prior information—when funding and designing interventions [53]. In other words, clear identification of the relative contribution of each causal mechanism is important.

This brings us to question (2). One approach to improving causal identification of politically motivated reasoning in the paradigmatic designs is to limit the influence of people's relevant prior beliefs and

information—for example, by statistical control [31,54] or by features of the design [53,55*]. These approaches are an improvement, but they are not panaceas: Residual confounding due to error in the measurement of prior beliefs could upwardly bias estimates of politically motivated reasoning. At the same time, 'partisan cheerleading'—expressions of political motivations in measurement of prior beliefs [56*]—could downwardly bias the estimates.

Relatedly, it is not always (or perhaps ever) straightforward to identify a priori *which* prior beliefs are most relevant to the reasoning task and should thus be accounted for. This identification problem is exacerbated insofar as different prior beliefs exhibit interdependencies and a hierarchical structure. To take a concrete example from earlier, it is unlikely that people have a specific prior belief about the validity of the Cognitive Reflection Test [13]. However, they could have prior beliefs about more general propositions like 'cognitive tests tend to be uninformative,' or 'Republicans tend to be more open-minded than Democrats,' both of which plausibly exert influence over their information evaluations in the experiment. Mapping the space of relevant prior beliefs may be intractable for some (or most) designs.

An underexplored but more tractable approach is to intervene on political motivation more directly, obviating heterogeneities in relevant prior beliefs. The precise form such a manipulation should take is somewhat unclear, hampered by the conceptual imprecision of politically motivated reasoning [1]. Nevertheless, on the view that normative pressure causes politically motivated reasoning [4**], one possibility is to manipulate the perceived normative pressure to hold a particular political opinion, and measure the downstream effect on people's reasoning. Another, related, design possibility is to randomize the incentives people have to persuade others of a political position [57]. These approaches align naturally with the trend towards understanding politically motivated reasoning as a product of the social incentives people face to hold particular political beliefs [4**,58,59].

In summary, our analysis does not imply that reasoning is unaffected by motivation. Rather, our analysis highlights that paradigmatic designs often fall short in identifying a *particular* motivation—that is, the motivation to reach a politically congenial conclusion—as causing reasoning, as opposed to other motivations, such as that for accuracy. Our analysis clarifies which study designs are likely to be more or less successful in identifying political motivation; and, we hope, helps guide future studies in clearly identifying the extent to which reasoning is held captive by political motivations.

Conflict of interest statement

Nothing declared.

CRedit authorship contribution statement

Ben M Tappin: Conceptualization, Writing - original draft. **Gordon Pennycook:** Conceptualization, Writing - review & editing. **David G Rand:** Conceptualization, Writing - review & editing.

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