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Traditionalism, Pathogen Avoidance,
and Competing Tradeoffs During a Global Threat

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Anthropology

by

Theodore James Samore

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ABSTRACT OF THE DISSERTATION

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Doctor of Philosophy in Anthropology

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Individuals vary in the extent to which they embrace their society's traditions, as well as in the perception

of threats as salient and necessitating mitigation. Traditionalism and threat sensitivity may be linked if—

over evolutionary time—traditions offered avenues for reliably addressing threats, either through

instrumental and/or ritual and cooperative benefits. Alternatively, if traditionalists are particularly attuned

to threats to their group, they may undertake stronger mitigating responses to those threats. These

possibilities – which are not mutually exclusive – suggest that greater traditionalism may predict stronger

mitigating responses toward particular threats. However, threat-avoidance motivations can conflict with

competing priorities and epistemic commitments in the real world. The COVID-19 pandemic represented

a moment in time in which people across the world undertook costly threat-mitigating behaviors,

providing an important test of the traditionalism-threat avoidance relationship under complex real-world

conditions.

Chapter 1 investigates the relationship between COVID-19 precautions, traditionalism, political

orientation, and perceptions of competing tradeoffs with public health measures in the U.S. early in the

COVID-19 pandemic. Results show that while more socially conservative and traditional Democrats reported taking more COVID-19 precautions than more liberal Democrats, that same relationship did not hold true among Republicans. Instead, Republicans placed greater emphasis on priorities that competed with COVID-19 precautions, which suppressed an underlying positive correlation between traditionalism and threat-mitigation among Republicans.

Chapter 2 investigates similar phenomena, but in a cross-cultural context given that perceptions of tradeoffs with COVID-19 precautions are likely to vary across social contexts. Data were collected on COVID-19 precautions, traditionalism, and associated tradeoffs across 27 different countries. Results indicated that, across these study sites, traditionalism tended to positively correlate with behaviors intended to mitigate the threat of COVID-19. Nevertheless, at some study sites, this relationship was suppressed by competing priorities, such as lower trust in scientists and greater concerns about personal liberties, similar to the results found in Study 1.

Traditionalism is often concomitant with meaning systems such as religion. Using the same dataset from 27 countries, **Chapter 3** further explores the relationship between religion and public health precautions. One predicted tested is whether religious precautions and public health precautions clashed during the COVID-19 pandemic, given the possibility for epistemic conflict between religion and science. An alternative prediction is that individuals hedge their bets by pursuing threat-mitigating behaviors across diverse epistemic domains. Results supported the latter possibility, showing that individuals' enactment of religious precautions positively correlated with their enactment of public health precautions, although again this relationship was sensitive to specific tradeoffs.

Chapter 4 reflects on possibilities for greater consilience between evolutionary and psychological anthropologies. Given the disciplinary siloing that occurs in academia, it is particularly important to consider how different fields can generatively produce better knowledge production through interaction. I point toward several areas of research as being particularly productive in this interchange, particularly in

the domains of cultural transmission and emotion. This interdisciplinary spirit is reflected in the empirical

work presented in Chapters 1-3.

The dissertation of Theodore James Samore is approved.

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CURRICULUM VITA

Theodore Samore received his BA in biological anthropology *magna cum laude* from Boston University in 2015, and his MA in biological anthropology from UCLA in 2017. His research focuses on traditionalism and its relation to real-world threats, such as infectious diseases, as well as the ways in which competing tradeoffs in the real world alter that traditionalism-threat relationship. He has published research examining how these topics intersect with phenomena including political orientation and the COVID-19 pandemic, as well as research on disparate topics including ectoparasites and cooperation-related emotions, in such journals as *Scientific Reports, PLOS ONE, Behavioral and Brain Sciences, Human Evolutionary Sciences,* and *Proceedings of the Royal Society B*. This research has received media coverage in such venues as The New York Times, CNN, Forbes, and the Los Angeles Times. He has also presented his research at meetings of the Human Behavior and Evolution Society, and the Issachar Fund and Templeton Religion Trust Evolution of Science and Religion Conference. He will start a position as a Research Fellow in the Religion Programme at the University of Otago in June 2023.

INTRODUCTION

1. Traditionalism

Individuals vary in the extent to which they endorse, practice, and enforce the cultural norms present in their social groups (Claessens et al., 2020; Henrich & McElreath, 2003; Ioannou & Laskowski, 2023). Moreover, many cultural norms are construed as *traditional,* such that the concept of traditionalism captures the individual tendency to adhere to this class of norms in particular. Given the central role that traditionalism plays in the following thesis, it is useful to undertake a definition of the concept. However, this is more complicated than it first appears. The boundaries delineating the traditional from the merely normative are amorphous. Time depth is clearly important to the conceptualization of tradition (Graburn, 2000), and works to separate ordinary norms from traditions. People can normatively conform to new fads and trends, yet these practices are unlikely to be conceptualized as belonging to a tradition util they have acquired some degree of longevity. Concordantly, many traditions likely started as simple norms. For example, while the wearing of academic regalia is now traditional, at some point robes were simply the fashion of the day (Platt & Walker, 2019). Conversely, people who ascribe to tradition can be strongly anti-normative (in the statistical sense)—many people or groups reject the majoritarian way of life in favor of a return to a real or imagined past. In light of the fact that individuals can be normative but not traditional, or traditional but not normative, norms and traditions appear to be separable phenomena, and time is clearly important in this differentiation.

However, as suggested by the term 'imagined past,' traditions are often invented (Hobsbawm & Ranger, 2012); that is, they are a hallucination (or an intentional construction) of

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what people think characterized the past, rather than an accurate reflection of high fidelity norms that have persisted unchanged through time. For example, while Scottish tartans are frequently imbued with traditional meaning, they are in fact a recent invention (Trevor-Roper, 2012). In this sense it is not actual time depth that necessarily renders something traditional, but rather the subjective impression of antiquity. Further, oldness does not guarantee that a norm takes on the property of traditionality. Many norms are likely old, yet they are not marked as traditional. For example, some arbitrary conventions may operate this way—driving on the right in the U.S. is a longstanding convention, yet Americans are unlikely to conceptualize of this norm as a deeply held cultural tradition. Likewise, people are typically non-monolithic in their embrace of tradition and the past – some domains appear more frequently (Bell, 2013; Inglehart & Baker, 2000) – some domains appear more likely to be so marked. Therefore, when engaging in the enterprise of distinguishing what characterizes a tradition, it is not sufficient to only assess time depth.

What other features, then, are important in the conceptualization of tradition? Given that people can simultaneously endorse traditions in some domains while embracing change in others, it seems reasonable to think that some content domains are more likely to be described as traditional than others. One possibility is that resolvability and rituality affects the tendency for norms to become traditional (Jagiello et al., 2022). When a norm is instrumental and causally resolvable, people may make decisions about the norm primarily on the basis of its payoff. Going back to the driving-on-the-right example, people propositionally understand the coordinative benefit of the convention. However, right-side drivers are willing to change their normative driving behavior when visiting countries that drive on the left.

In contrast, ethnic markers and rituals intuitively seem more likely to be considered traditional. In those cases, the perceived time depth of the tradition may be more important in structuring its value. For instance, in the case of ritual, if one possible etic function is to facilitate group cooperation (Sosis, 2004), it may be easier to coordinate around long-standing traditions than around novel practices. For example, the meaning imbued in ritual may be sensitive to emotional experiences during key developmental windows (Alcorta & Sosis, 2005), and hence drastic change may diminish the subjective experience that is likely critical in proximately motivating ritual. Likewise, imbuing ethnic markers with tradition—and the implied time depth—may accentuate contrasts between groups, regardless of the actual history of the practice (as in the case of Scottish tartans). In fact, tradition may simply be a proximate mechanism for indexing longstanding norms that fall within certain critical domains such as ritual or ethnic markers. However, the above possibilities are merely conjecture; future research is needed to elucidate the importance of ritual and moral salience in structuring traditions.

Taken in sum, there are clearly features working to differentiate ordinary norms and traditions. However, systematically discriminating between them is not straightforward. Antiquity alone is not sufficient for determining traditional-ness, as evinced by the fact that some norms are old but not traditional, while some traditions are part of an imagined-yet-not-real past. Further, norms are unlikely to be equipotent in their ability to become traditions; rather, some content domains should lend themselves to tradition more than others. However, what characterizes those domains is not entirely clear.

The work presented below considers how these conceptualizations of tradition relate to perceptions of danger in the world. Further, it assumes that traditions are separable from norms, that tradition is an emically-marked category, and that real- or perceived-time-depth plays a

necessary but not sufficient role in determining membership in that category. Further, my research is focused on traditionalism as a dimension of individual variation, in the sense that people vary in how strongly they subscribe to a worldview oriented around tradition. Importantly, groups are not monolithic in respect to traditionalism, despite the use of terminology such as "modern" and "traditional" societies (Gusfield, 1967). Although this work does not fully disambiguate between the various possibilities presented above, future research ought to engage in providing greater clarity in disambiguating between traditions and other kinds of normative cultural practices and beliefs.

2. Traditionalism and Threat Sensitivity

Traditionalism as a dimension of individual difference is undoubtedly a complex and multi-determined phenomenon. That is, many different processes likely shape the extent to which an individual embraces tradition, and in turn, traditionalism likely has many downstream effects on other beliefs and behaviors. Of these many possibilities, my work focuses on the ways in which threats intersect with traditionalism. In particular, I am interested in whether and how traditionalism overlaps with threat sensitivity, or variation in the tendency to attend and respond to hazards. Recent research indicates that threat sensitivity may correlate with traditionalism, as well as related worldviews such as socially conservative political ideology (Claessens et al., 2020; Hibbing et al., 2014). Researchers have particularly focused on pathogen threats, finding that more traditional and/or socially conservative people are more likely to take mitigating behaviors with regard to infectious disease or cues thereof (e.g. Aarøe et al., 2017; Fischer et al., 2020; Murray & Schaller, 2012; Tybur et al., 2016).

What is termed the *traditional norms account* (Tybur et al., 2016) thus identifies threat-mitigating behaviors—particularly in response to pathogens—as an important factor related to traditionalism. However, multiple causal pathways exist that could explain the connection between these phenomena. Here, the evolutionary logic underlying these various pathways will be discussed, although the possibilities presented below are non-exhaustive. Further, although the empirical work that constitutes the core of this thesis cannot adjudicate between these causal possibilities, these explanations form an important basis for making sense of patterns observed in the world.

The first causal model to be discussed proposes that greater threat-avoidance motivations lead to greater traditionalism (see Box 1). That is, threat sensitivity causes individuals to be more likely to embrace tradition and traditionalism. As stated before, traditionalism is multi-determined, hence the claim here is not that threat sensitivity and traditionalism are isomorphic. Rather, threat sensitivity may be one of many different processes that causally influences the extent to which an individual embraces tradition.

In this model, there are several pathways by which traditionalism may reliably ameliorate the costs of threats, and hence lead threat-sensitive individuals to embrace traditionalism. First, as a result of cultural evolutionary processes that lead to fitness-enhancing norms (Henrich & McElreath, 2003), some traditions may instrumentally mitigate the costs of particular threats in the local environment (e.g. Henrich & Henrich, 2010; Murray et al., 2017; Tybur et al., 2016). For example, traditions revolving around greetings and food preparation may instrumentally mitigate pathogen threats. If those instrumental benefits are discernable, more threat-sensitive individuals may selectively focus on those particular traditions that have threat-mitigating properties. In this case, threat sensitivity may not be broadly related to traditionalism, but rather

only selectively so depending on the content of the traditions in question. However, the causal mechanisms underlying many norms and traditions can be opaque (Henrich, 2011; Zwirner & Thornton, 2015). If individuals are unsure which particular traditions have instrumental threat-mitigating properties, they may adhere to traditions broadly in order to leverage the fact that some of the particular traditions contained therein will be instrumentally threat-mitigating, assuming that those benefits outweigh the costs of imprecision.

In addition to instrumental benefits, as discussed in the first section, traditions may have broad cooperative and coordinative benefits as ethnic markers and rituals (Mcelreath et al., 2003; Sosis, 2004). This provides an alternative pathway by which greater threat sensitivity could lead to greater traditionalism. Specifically, while broadly beneficial via increased social support, cooperation structured around shared traditions could plausibly ameliorate costs by providing care, protection, and resources in the face of threats (Sugiyama, 2004). Therefore, individuals who are more sensitive to the costs posed by threats may be more traditional given the threat-buffering benefits of tradition-oriented cooperation and coordination.

For the above possibilities, the linkage between traditionalism and threat-sensitivity may be dispositional and long-term, such that people with a more threat-oriented disposition also have long-term preferences for tradition. Alternatively—and non-mutually exclusive with the above—there may be facultative plasticity, such that during times of particular danger, people upregulate their embrace of tradition (Fischer et al., 2020; Nail & Mcgregor, 2009).

However, the causal relationship between traditionalism and threat sensitivity may in fact be reversed—although these two causal pathways are not mutually incompatible—see Figure I2. Specifically, embracing traditions entails tradeoffs. Indeed, if there were no downsides, traditionalism would be unlikely to vary substantially across individuals. The possible benefits of

traditionalism have already been discussed – they may facilitate cooperation and/or coordination, and by leveraging cumulative cultural evolution, they may also provide instrumental solutions for mitigating threats in the local environment. However, there are also possible costs. For example, orienting toward traditions may lead individuals to view innovation with skepticism. Innovations may not always have a higher payoff, but, if they do, traditionalists risk losing out on those benefits by virtue of a worldview that emphasizes practicing the tried and true. Of course, the precise payoff structure will also vary across time and space, further maintaining variation.

There is a second possible cost that is more directly relevant to the potential association between traditionalism and threat sensitivity. Specifically, traditionalists may be pursuing a social strategy that relies on cooperation with likeminded in-group members who practice the same traditions and rituals, and hold the same traditional values. However, this strategy may resultantly be more vulnerable to harms that threaten the group and its stability (Barclay & Benard, 2020; Claessens et al., 2020). Therefore, traditionalists may be more sensitive toward group-harming threats—such as pathogens, social change, and outgroup violence—than non-traditionalists. Given the wide range of threats that could destabilize groups, this causal pathway could similarly generate a wide-ranging association between threat sensitivity and traditionalism.

3. Conclusion

Taken in sum, there are empirical and theoretical reasons to believe that traditionalism and threat sensitivity may be connected. Yet, the precise association between them is likely to depend on the complex nature of cost-benefit structures in the real world, especially given the over-determined nature of the phenomena. Further, additional beliefs and meaning-making systems are likely to jointly shape individuals' responses to both threats and traditions.
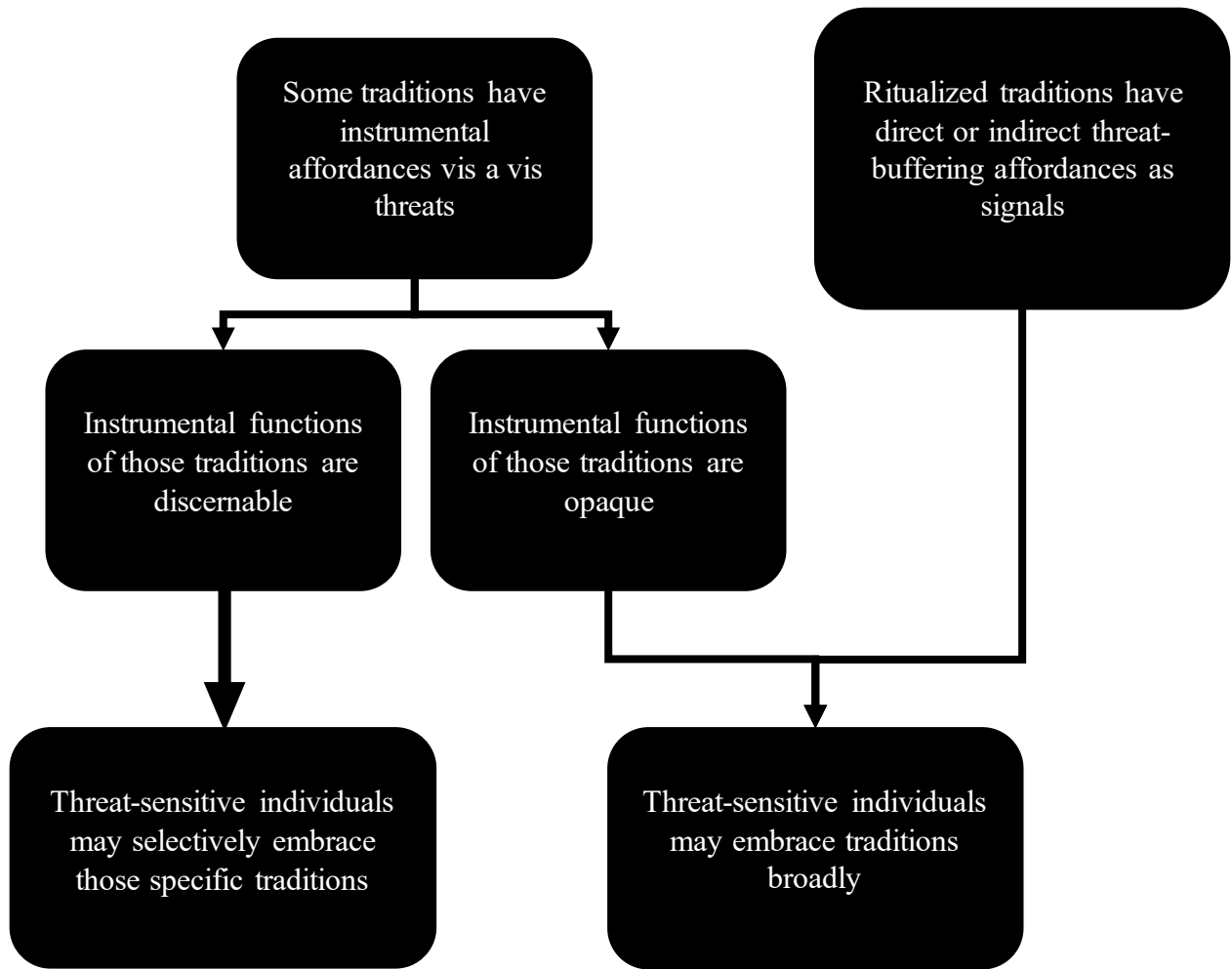
Figure I.01 Threat Sensitivity → Traditionalism pathway. Box diagram showing one set of

pathways by which traditionalism and threat sensitivity may be causally related.
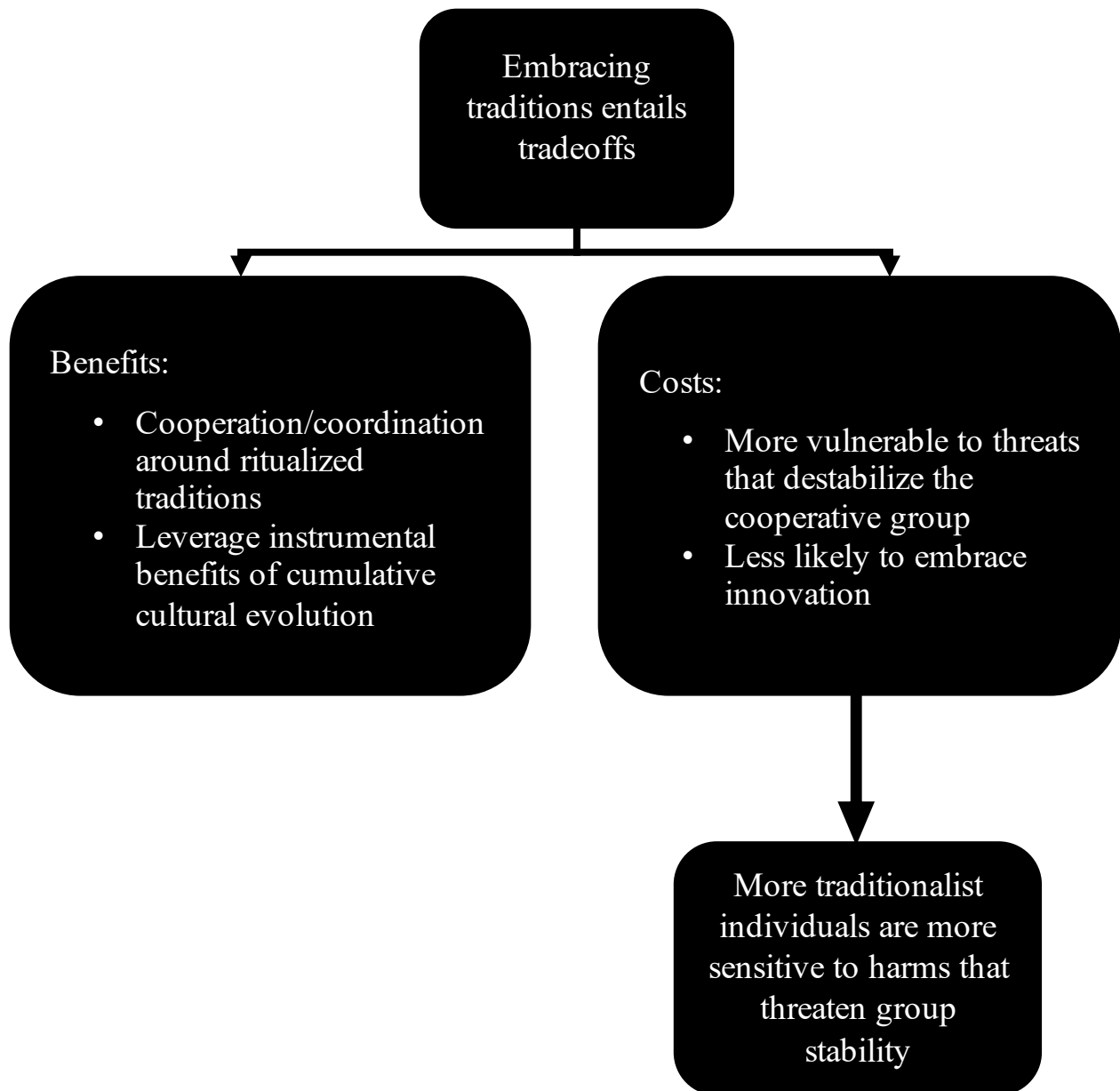
Figure I.02 Traditionalism → Threat Sensitivity pathway. Box diagram showing alternative

pathway by which traditionalism and threat sensitivity may be causally related.

Much of the prior research in this area relies on subjective responses to hypothetical scenarios that leave the costs of threat-avoidance and the complexities of real-world decision-making underspecified (but see Gul et al., 2021; Tybur et al., 2020). In this thesis, I explore the relationship between threat sensitivity and traditionalism under complex, real-world conditions—namely the COVID-19 pandemic, which was both globally salient and highly impactful on individuals' behavior. Although the pandemic provides the context in which this research was undertaken, the results presented in the chapters below speak to broader issues regarding traditions, threats, and the complex tradeoffs between them.

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CHAPTER 1

Socially Conservative Attitudes Positively Associate with

COVID-19 Precautions Among U.S. Democrats but not Republicans[1]

Abstract

Social liberals tend to be less pathogen-avoidant than social conservatives, a pattern

consistent with a model wherein ideological differences stem from differences in threat

reactivity. Here we investigate if and how individual responses to a shared threat reflect those

patterns of ideological difference. In seeming contradiction to the general association between

social conservatism and pathogen avoidance, the more socially conservative political party in the

United States has more consistently downplayed the dangers of COVID-19 during the ongoing

pandemic. This puzzle offers an opportunity to examine the contributions of multiple factors to

disease avoidance. We investigated the relationship between social conservatism and COVID-19

precautionary behavior in light of the partisan landscape of the United States. We explored

whether consumption of, and attitudes toward, different sources of information, as well as

differential evaluation of various threats caused by the pandemic—such as direct health costs

versus indirect harms to the economy and individual liberties—shape partisan differences in

responses to the pandemic in ways that overwhelm the contributions of social conservatism. In

two pre-registered studies, socially conservative attitudes correlate with self-reported COVID-19 prophylactic behaviors, but only among Democrats. Reflecting larger societal divisions, among Republicans and Independents, the absence of a positive relationship between social conservatism and COVID-19 precautions appears driven by lower trust in scientists, lower trust in liberal and moderate sources, lesser consumption of liberal news media, and greater economic conservatism.

Introduction

In the spring and summer of 2020, the COVID-19 pandemic was profoundly shaping the personal, social, and political lives of most Americans. Although case counts across most of the United States were relatively low compared to the subsequent fall and winter waves, the pandemic's effects were already widely felt. Many people adopted a suite of prophylactic behaviors, including mask wearing, social distancing, disinfecting, and social isolation to avoid infection. Many businesses, services, and schools were ordered closed in order to stem the spread of the pandemic. In turn, the effects of the pandemic and subsequent closures resulted in substantial economic decline, sparking political debate about both the cost-benefit trade-offs of COVID-19-related restrictions, as well as the nature and extent of economic relief measures. Notably, the pandemic was also heavily politicized [1]. In general, politicians from the Republican party and sympathetic media figures downplayed the direct health severity of the pandemic relative to their Democratic counterparts, while emphasizing the costs of closures and restrictions to both the economy and personal liberty.

Potentially motivated by the lead-up to a presidential election in November 2020 and a desire to minimize a national crisis that could negatively impact his electability, then-President Donald

Trump and his allies in the Republican party consistently downplayed the threat posed by the pandemic, claiming variably that the virus would disappear, that it was not any more dangerous than seasonal flu, and that prophylactic measures such as mask wearing were unnecessary [2]. Polling and research suggests that these attitudes among party elites were also reflected among supporters of the Republican party [3], including in their own health-related behaviors such as social distancing and mask-wearing [4,5].

Yet, in contrast to this dynamic in the United States where Republicans – the more socially conservative party – have been more skeptical than Democrats of the dangers of the COVID-19 pandemic, a large previous literature has both theorized and demonstrated a positive association between social conservatism and sensitivity to threats, particularly threats from pathogens [see 6]. Here, in two studies conducted in the spring and summer of 2020, we explore the partisan patterns of U.S. responses to COVID-19 as a case study that challenges theoretical frameworks that link together political orientation, attitudes toward traditional norms, threat sensitivity, partisanship, and cost-benefit trade-off calculations between competing sources of threat.

In political psychology scholarship, *social conservatism* and *social liberalism* are largely treated as ends of an attitude spectrum representing, respectively, resistance to, or encouragement of social change [see 7]. An emerging body of theory and research suggests that individual differences in social conservatism are associated with individual differences in *threat sensitivity*– the tendency to process threat-related cues as salient, attention-garnering, emotionally evocative, and behaviorally motivating. At an ultimate level, such an association could occur if, over historical and evolutionary timescales, traditional social norms reliably mitigated threats. As a consequence, at the proximate level, and potentially independently of conscious awareness,

individuals who are more sensitive to the possibility of threats may assume that traditional and socially normative practices offer a form of precaution and threat management.

The potential threat-mitigating properties of *traditions*—that is, practices and norms that invoke both a moral valence and a real or imagined time-depth—could manifest via multiple, non-mutually exclusive benefit streams. First, specific traditions may actually provide direct protection against threats; cultural evolution may produce norms that instrumentally mitigate the costs of either specific threats, or certain domains of threat, including pathogens [8]. Individuals might explicitly recognize or implicitly assume the specific connections. However, because the functionality of norms is frequently opaque to adherents [9,10], hazards may be implicitly assumed to be addressed by endorsing traditions broadly, even in domains apparently unrelated to a given class of threats. This holds true so long as the frequency and magnitude of those instrumentally threat-mitigating traditions outweigh the potential costs of following non-instrumentally adaptive traditions as part of a wholesale commitment to traditions broadly (although traditions can have adaptive value outside of their instrumentality, see below). Second, via increased social support, adhering to traditional norms can provide broad benefits, including the mitigations of threats (such as coalitional conflicts, interpersonal conflicts, or illnesses), for example, by advertising the adherent's identity as a member of the in-group who merits aid [11,12]. In addition, traditions may be felicitous as coordination devices. Alternatively, a non-adaptive association between traditionalism and threat sensitivity could arise in particular cultural contexts, for example if individuals and/or institutions may present traditions as possessing threat mitigating properties or as being broadly beneficial, irrespective of the actual instrumental utility of those traditions. Via processes of cultural transmission, individuals may then ascribe threat mitigating benefits to those traditions.

If, over evolutionary time, on average these functions (or other unrecognized functions) resulted in traditions mitigating the costs of threats, then, as part of their evolved psychology, individuals may instinctively perceive that traditions writ large ameliorate the costs of those threats, either within or outside of conscious perception. However, adherence to traditions also entails costs, as, while subject to uncertainty, non-traditional practices can present valuable opportunities. The propensity to cleave to tradition or adopt innovations may thus partly hinge on whether, for a given individual in a given place and time, threats loom larger than opportunities.

In the U.S. and other large democracies, socially conservative political ideologies and parties frame their positions on social issues as maintaining the values and practices of the past [13]. Variation in threat sensitivity may thus shape political behavior and party preferences in countries such as the U.S. [6,14], with higher threat sensitivity associated with both greater traditionalism and greater social conservatism. When considering associations between threat avoidance and socially conservative attitudes (encompassing both general attitudes toward traditions, and specific policy preferences that emphasize social continuity), it is important to distinguish distinct dimensions of political orientation. Social and economic conservatism reflect different ideological foci, where the former concerns attitudes toward social change, and the latter concerns attitudes toward fiscal policy [15]. Although these ideological dimensions sometimes cohere in contemporary political entities—such as the Republican party in the U.S.— the association may not be inherent. Assuming that social conservatism centers on maintaining the (real or imagined) practices of the past, while economic conservatism does not, the *traditional-norms account* laid out above privileges the former as the driver of the association between threat sensitivity and political ideology in general, implying that social conservatism

should be more strongly related to threat avoidance than other forms of political ideology and related attitudes.

A growing empirical literature has tested this hypothesized link between threat sensitivity and attitudes toward social change, finding that preferences for tradition—as well as socially conservative political ideologies—associate with greater sensitivity toward certain threats [see 6,16]. Convergently, evolutionary modeling work has demonstrated that, at the group level, high degrees of objective threat favor the evolution of greater norm adherence [17]. However, the extent to which sensitivities to different categories of threats are associated with political ideology is contested [18], and the volume of evidence varies by threat domain. Pathogen threat is one of the most extensively studied domains, and socially liberal, less traditional individuals have consistently been found to be less pathogen-avoidant than their conservative counterparts [19–21]. In sum, if greater threat sensitivity leads to upregulated threat-mitigation behaviors across different domains, then the general endorsement of traditions should tend to co-occur with other investments in threat mitigation such as pathogen avoidance behavior [19,22]. Concordantly, a related body of scholarship has theorized and empirically tested the possibility of conservative shifts in response to real-life threats [14,23–25; but see 26]. The underlying functional logic is shared with the traditional norms account: if traditions and socially conservative norms can mitigate the costs of recurrent threats, then cues of increased threat may lead individuals to flexibly upregulate their traditionalism and social conservatism in response. Indeed, the possibility that temporal variation in threats results in conservative shifts is not mutually exclusive with the possibility that trait threat sensitivity influences social conservatism. Rather, both relationships may result from a shared underlying process that links threat to resistance to social change.

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In hypothesizing a link between socially conservative attitudes and threat sensitivity, much of the research examining the postulated relationship employs hypothetical scenarios that often unrealistically ignore trade-offs accompanying actual behavior. Such measures present threat cues, offering participants some basis for estimating the costs of exposure to threats, and therefore the benefits of threat-avoidance, but generally leave unspecified the costs of avoiding the threats (e.g., opportunity costs, increased vulnerability to other threats, etc.). Thus, prior research [6,19,21,27] has focused mostly on the benefits of threat avoidance, in turn limiting the ecological validity of the findings. Greater attention to costs is needed to more fully understand cost-benefit tradeoffs. Accordingly, recent work has started to address the effects of tradeoffs on threat and pathogen avoidance behaviors [28,29]. In addition, the previously discussed empirical observations of conservative shifts in response to real-world threats likely implicitly summarize the cost-benefit trade-off calculations that individuals may be making.

The present research seeks to address many of the limitations found in the prior literature. The COVID-19 pandemic involves a dangerous pathogen threat, one that is both highly salient for much of the world's population, and has had marked effects on real behavior. The extent to which variation in individuals' costly prophylactic responses associate with variation along the social and political dimensions discussed above may therefore illuminate the hypothesized relationship between socially conservative attitudes and threat sensitivity. Specifically, precautions taken in response to the COVID-19 pandemic may reflect threat sensitivity in the pathogen domain in light of the real-world trade-offs between different threat domains. Indeed, speaking to the possibility of these kinds of trade-offs, initial evidence suggests that individuals make COVID-19 precaution trade-offs with the mate-seeking domain [28]. Further, because reports of actual behavior summarize many of the implicit calculations being made by

individuals, COVID-19 precautions plausibly more accurately reveal the intersection of baseline threat sensitivity and trade-offs among multiple threat domains than do questions about hypothetical cues of pathogen presence, generic items about danger, or broad statements regarding concern about the pandemic.

Some of the precautions recommended or required by public health authorities interfere with engaging in traditional practices (e.g., social distancing precludes family gatherings, public sporting events, in-person religious services, etc.). Accordingly, two possibilities exist regarding the relationship between threat sensitivity, socially conservative attitudes, and COVID-19 precautions. On the one hand, if more threat-sensitive individuals focus on the danger posed by COVID-19 over and above the conflict with various traditions entailed by precautionary behaviors, then they will report both greater precautionary behavior and greater valuation of traditions than will less threat-sensitive individuals. On the other hand, highly threat-sensitive individuals may view such behaviors as threats in themselves, endangering individual liberties or economic prosperity. If more threat-sensitive individuals focus on the precautions themselves, construing these as infringing on traditions, then they will report lower precautionary behavior than less threat-sensitive individuals, potentially resulting in a *negative* relationship between traditionalism and precautionary behaviors.

Initial empirical work suggests that social conservativism associates with precautions in response to COVID-19, and—relating back to the question of conservative shifts—that socially conservative attitudes may have increased since the start of the pandemic as a function of perceived threat [30–32; but see 33,34]. Yet, in the U.S., the politicization of COVID-19 has resulted in supporters of the Republican party—despite being characterized by higher social conservatism and a stronger commitment to traditional cultural values [15,35] taking a more

skeptical view of the danger posed by the disease [3], enacting fewer real-life precautions [5], and holding more negative attitudes toward precautions such as mask wearing [36]. This suggests either that the traditional-norms account is incorrect, or that other factors are influencing Republicans—either trade-offs with attempts to mitigate other threats, conflicts with traditions, or broader factors that are independent of threat mitigation per se. For example, different information environments—as a function of the types of media individuals consume, and the types of figures whom individuals trust—may relate to the specific threat cues that are experienced as most salient [37]. A primary objective of this study is thus to examine the relative contributions of political ideology and the consumption and endorsement of partisan messaging in relation to precautionary COVID-19 behaviors.

Here, we study whether more socially conservative and traditionalist individuals are more pathogen-avoidant in the face of a real-world disease threat unprecedented in recent memory, examining whether individual differences in ideology reflect precautionary behaviors, and assessing whether such relationships are associated with exposure to politicized messaging. Because contemporary American political parties are amalgams of different ideological dimensions, we attempt to disentangle perceived trade-offs between different threat domains, and the relationships among those various components—specifically, if economic conservatism is associated with greater salience of threats to economic liberties, and social conservatism has such a relationship with pathogen threats, then there may be a complex interplay between economic and social conservatism. Accordingly, exploratory analyses of our data can inform hypotheses about causal pathways among these variables.

Conducted in the context of the COVID-19 pandemic and the socio-political response in the U.S.A., our work tests the hypothesized connection between threat sensitivity and political

beliefs, affording examination of these relationships and their connection to high stakes real-world behaviors. This novel context necessarily requires the use of untested measures, hence these studies are best considered preliminary. Below, we specify the issues examined.

Research Questions and Hypotheses

1. *How does COVID-19 precautionary behavior relate to socially conservative political dimensions?*

The traditional-norms account of the relationship between socially conservative attitudes and threat sensitivity holds that, because traditions promise buffers against the vagaries of a dangerous world, individuals for whom particular threats – including pathogen threats – loom large will cleave more strongly to traditions. If so, and if COVID-19 prophylaxis indexes such dispositional greater threat sensitivity in the pathogen domain, then, all else held constant, socially conservative political attitudes should be associated with COVID-19 prophylaxis. The absence of such a relationship could be attributable to the hypothesis being wrong, or to a violation of the ceteris paribus assumption; we discuss the latter below. Alternatively, if people view some COVID-19 precautions as violating tradition, then precautions and socially conservative attitudes may negatively correlate, again violating the ceteris paribus assumption.

2. *Do partisan differences play a role in the relationship between precautionary behaviors and socially conservative political differences?*

The ceteris paribus assumption underlying the traditional-norms hypothesis may not apply. In the U.S., people receive different information about the pandemic as a function of media partisanship. For example, most of the public voices questioning the severity of the outbreak are conservative leaders and conservative media outlets associated with the Republican

party [38,39]; correspondingly, Republicans report less concern than Democrats that COVID-19 poses a major health threat [3]. Further, Republicans may weigh the economic and personal-liberty threats posed by prophylactic reactions to the pandemic as more serious relative to direct health threats. This suggests that, in the U.S., endorsement of socially conservative political attitudes and support for socially conservative political coalitions may not be associated with greater COVID-19 prophylaxis.

While there are principled reasons to think that perceived trade-offs between different domains may shape partisan differences in costly COVID-19 precautionary behaviors, many mechanisms could drive such differences. We approach possible countervailing drivers of partisan differences in COVID-19 precautions using a theoretically-motivated inductive approach, and include a large number of variables that may shape partisan differences in responses to COVID-19; below, we explain the rationale for each.

2A) Accounting for other dimensions of ideological attitudes

The traditional-norms account specifically predicts that socially conservative attitudes should associate with threat sensitivity, but does not make predictions regarding other dimensions of ideological attitudes, such as opinions concerning economic or militaristic political issues, or related personality traits such as social dominance orientation, authoritarian aggression, and submission to authority. Yet, these different facets of political belief are highly correlated [7], such that they need to be ruled out as causes of any relationship between socially conservative attitudes and precautionary COVID-19 behaviors.

Further, despite higher-order correlations, distinct ideological dimensions may lead individuals to differentially prioritize clashing threat domains. For example, economic conservatism—and preferences for limited government intervention in the public sphere—may

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heighten sensitivity toward perceived threats posed by government responses to the pandemic, such as public health directives and economic closures. These concerns may outweigh the perceived pathogen threat posed by COVID-19, or mask the relationship between socially conservative attitudes and pathogen avoidance behaviors [40].

Additionally, although a large literature indicates that conservatives are more threat-sensitive than liberals across many domains and mechanisms [6], some evidence suggests that conservatives may also view those threats—which they perceive more readily—as more easily vanquished [41]. In the context of the pandemic, this suggests that, while conservatives may recognize that the disease represents a substantial threat, they may also be more confident in their ability—or the ability of their leaders—to mitigate that threat. This may be related to confidence in one's traditions, or to aspects of right-wing authoritarianism and explicit political ideology, such as authoritarian aggression, submission to authority, and militaristic political orientation.

2B) Media consumption habits

Media outlets in the U.S. have covered COVID-19 from different perspectives, with conservative media being more skeptical of the severity and health consequences. The content of news coverage has been shown to shape both beliefs about scientific claims in general [42], and responses to COVID-19 in particular [43]. Thus, asymmetry in partisan coverage of the coronavirus outbreak may influence both precautionary behaviors and the relationship between those behaviors and socially conservative attitudes. Alternatively, individuals' media choices may reflect, rather than cause, abiding differences that drive potential variation in responses to the pandemic along partisan lines; our data will not adjudicate between these possibilities.

In addition to differing in their exposure to various news streams, individuals differ in whom they listen to for advice about the outbreak, including media, political, and scientific

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sources. These differences are likely also important in determining how individuals' social preferences inform their behavioral responses to COVID-19, especially given partisan differences in the types of authorities that individuals trust.

2C) Demographics

Republicans and Democrats differ, on average, along multiple demographic dimensions, including ethnicity, gender, age, and education; they also live in regions differing in population density, creating differences in opportunities for disease transmission [44]. Additionally, at the time data were collected, the distribution of coronavirus outbreaks across the U.S. was highly skewed along geographical and urban/rural lines. We therefore explore whether such demographic variables influence the relationship between precautions and conservatism.

3. *Are behavioral responses to COVID-19 related to trait pathogen avoidance?*

An extensive corpus links pathogen avoidance to disgust sensitivity [45]. If disgust sensitivity is an emotion-potentiating mechanism for motivating some pathogen avoidance behaviors, then it should positively correlate with actual prophylaxis. Further, disgust sensitivity associates with socially conservative attitudes, per the traditional-norms account. Because disgust proximately motivates pathogen avoidance, disgust sensitivity measures may statistically account for the relationship between socially conservative attitudes and COVID-19 behaviors. Alternatively, pathogen disgust may not be as reliably triggered by cues of respiratory infection compared to other pathogen cues, in which case disgust may not mediate a precautions-socially conservative attitudes relationship.

Methods:

Studies were approved by the UCLA Office of the Human Research Protection Program under approval number IRB#14-001681-AM-00029. Informed consent via a written information sheet was obtained before participation. Complete surveys, datasets, analysis code, and preregistrations of predictions and methods are available at https://osf.io/k92wg/. The full measures can also be found in Appendix 1.

Project overview:

A pilot study was conducted on April 17th, 2020 to examine the hypotheses and develop measures (see Appendix 1 for full description of methods and results). Methods were subsequently refined. We enlarged sample size to enhance power for detecting effects of interest; increased the granularity of measures of media consumption, and of trust in individual and institutional information sources; and added detailed measured of responses to, and perceptions of, economic costs of the pandemic, as well as perceived threats to individual liberties posed by government mandates. We then ran two studies using identical methods 43 days apart; these conceptually replicated and extended the principal results of the pilot. Study 2 tested the replicability of Study 1, particularly given changes in the pandemic that could affect relationships between American political attitudes and precautionary behavior. For example, in the period between Studies 1 and 2, disease prevalence increased in U.S. regions that were less liberal than the urban areas which first saw large outbreaks [46], while individual and governmental precautions, such as mask wearing, became more politicized.

Sample size:

In the pilot study ($N = 433$), socially conservative attitudes were correlated with COVID-19 precautionary behaviors at $r = .11$ across all participants. This effect is consistent with previous

studies examining the relationship between pathogen-threat sensitivity and similar political and attitudinal measures [19,21]. With $\alpha = .05$, and power $= .80$, the projected sample size needed given the pilot results is approximately 646. However, because we are interested in political party-specific effects, adequate subsamples for each major American political party are needed. In the pilot, 27% identified as Republican and 52% as Democratic. To sufficiently recruit in each subgroup to detect effect sizes consistent with the pilot, we doubled our recruitment target to approximately 1,000.

Participants:

In both Studies 1 and 2, 1,008 adult U.S. participants were recruited on Amazon Mechanical Turk and paid $2.75 (20-minute HIT, 99% approval rating, minimum completed HITs = 500). From the pilot study onward, each sample comprised workers who had not previously participated in this project. Data were prescreened for repeat participation, minimum completeness, minimum completion time, and answers to "catch questions". Study 1's final N was 906 (43% female; 69% white; age range 18-77 [$M = 39.2$, SD $= 12.2$]). Study 1 ran on May 29th, 2020, when many lockdown orders were expiring across the U.S. [47]. Study 2's final N was 906 (49% female; 76% white; age range 18-89 [$M = 40.6$, SD $= 13.2$]). Study 2 ran on July 11th, 2020, when cases were increasing in many U.S. states and were more widely geographically distributed, while lockdown orders varied widely [47] and some precautionary behaviors—such as mask wearing—had become more politicized [48].

Measures:

Measures, and the order of presentation, were identical in Studies 1 and 2. The order of the first four measures described below was randomly counterbalanced.

Political orientation

Although political orientation is often described as if it were inherently unidimensional, such apparent unidimensionality may actually reflect partisan coalitional dynamics. Accordingly, rather than assume that individuals' positions are necessarily uniform across multiple components of political orientation, we measured political orientation using a modification of Dodd et al.'s [49] version of Wilson and Patterson's [50] multifaceted issues index. Participants were asked to indicate whether they agree, disagree, or are uncertain about various prominent issues in contemporary American politics. These are subdivided into three categories: social (e.g., abortion), economic (e.g., tax rates), and military (e.g., foreign intervention) issues. Agreement was scored as +1, disagreement as -1, and uncertainty as 0; liberal items were reverse scored, hence increasing positive values reflect greater conservatism. Responses were averaged within each subscale, producing a composite measure for each of the three dimensions.

Traditionalism and Right-wing Authoritarianism

Participants completed the Aggression-Submission-Conventionalism scale (ASC), which measures the concepts of right-wing authoritarianism employing politically and religiously neutral language [51]. Here, we operationalized the Conventionalism subscale as reflecting attitudes toward traditions, as the items in this subscale are explicitly intended to measure, "commitment to the traditional social norms in one's society" [51], e.g., "Traditions are the foundation of a healthy society and should be respected". Participants also completed the *authoritarian aggression* (e.g., "Strong force is necessary against threatening groups") and *submission to authority* (e.g., "We should believe what our leaders tell us") subscales. For all three subscales, participants rated their agreement with statements on a 7-point Likert scale, from "strongly disagree" to "strongly agree". Half of the items indicated agreement with

traditionalism, aggression, and submission, and the other half (reverse scored) indicated disagreement. Scores were averaged within each subscale.

Socially conservative attitudes

Political orientation is often measured using a single-item unidimensional scale ranging from conservative to liberal. However, as we have noted, it is critical to separate distinct dimensions of ideology [14], such as economic and social conservatism or liberalism. Further, political ideology is complex, and encompasses both specific policy preferences in a given political context, as well as the kinds of general attitudes that help shape those preferences; in the context of social conservatism, the endorsement of tradition is likely a constituting attitude of the ideology. To operationalize social conservatism in light of these considerations—characterized by both specific policy preferences involving matters of tradition and cultural change, and general attitudinal orientation toward tradition and change—we created a composite socially conservative attitudes ideology scale. This composite scale consisted of the rescaled responses from the Dodd-style issues index and the conventionalism subscale of the ASC (see previous sections for example items). Both the issues index and the ASC scale have been widely used to measure social conservatism and attitudes toward tradition (e.g., 19,49). Further, because these individual scales focus on, respectively, general attitudes toward tradition, and specific policy preferences related to social conservatism, combining them provides a more complete measurement of socially conservative ideology. The resultant composite socially conservative attitudes variable was measured on a -1-to-1 scale, where increasing scores indicate increasing socially conservative attitudes. This composite was reliable (αs = .89 – .90).

Social dominance orientation

We used the four-item Short Social Dominance Orientation Scale [52]. Participants rated agreement with items such as "Superior groups should dominate inferior groups" on a 7-point Likert scale, from "strongly disagree" to "strongly agree". Half of the items were reverse coded; responses were averaged across items.

Pathogen disgust sensitivity

Participants completed the pathogen subscale of the Three-Domain Disgust Scale [53], rating how disgusting they found seven hypothetical scenarios (e.g., stepping on dog feces) using a 7-point Likert scale, from "not disgusting at all", to "extremely disgusting"; responses were averaged across items.

COVID-19 precautionary behaviors

Our novel measure consisted of 12 questions concerning precautionary health behaviors in response to COVID-19, including the frequency of mask wearing, hand washing, social distancing, and disinfecting, and the importance to the participant of stocking up on supplies such as hand sanitizer and household disinfectants. Items were rated on 7-point scales, from either "never" to "as often as possible", or from "not important at all", to "extremely important". Participants were also asked the extent to which they were following local lockdown restrictions, and whether they had been careful to physically distance from people outside their household. Responses were averaged across items, creating a reliable composite (αs = .85 – .86).

Trust for sources of COVID-19 information

Employing neutral language, we examined participants' confidence in various sources of information across the ideological spectrum about COVID-19. In Study 2, we included a range of individual media figures, identified by name only (e.g., conservative talk-radio host Rush

Limbaugh), health professionals (e.g., Dr. Anthony Fauci, Director of the U.S. National Institute of Allergy and Infectious Diseases), politicians (e.g., U.S. President Donald Trump), media organizations (e.g., The New York Times), health organizations (e.g. the U.S. Centers for Disease Control and Prevention), and categories of people (e.g., liberal/conservative journalists, medical scientists). Using exploratory factor analysis (see Appendix 1 for details) to determine the structure of trust responses, we extracted three conceptually coherent factors, which we labeled: *trust in scientists* (including items such as trust in Dr. Fauci and the CDC), *trust in liberal and moderate information sources* (including items such as trust in liberal and moderate journalists, and media figures such as liberal television news host Rachel Maddow), and *trust in conservative information sources* (including items such as trust in conservative journalists, and figures such as Rush Limbaugh). When averaged into separate composites, these factors were reliable in both studies (trust in scientists: $\alpha s = .86 - .87$; trust in liberal and moderate information sources: $\alpha s = .95 - .96$; trust in conservative information sources: $\alpha s = .96$).

Other COVID-19-related items

We surveyed participants about various beliefs and experiences regarding the COVID-19 pandemic, divisible into six categories.

1   Perceived effectiveness of prophylactics against COVID-19: On a 7-point Likert scale from "not at all protective" to "extremely protective", participants rated the effectiveness in protecting against COVID-19 of a variety of prophylactics (e.g., "How well do you think each of the following protects you from COVID-19… hydroxychloroquine … mask-wearing?", etc.).

2   COVID-19 domain-specific threat-assessments: Participants gauged the relative hazards posed by different threats caused by the COVID-19 outbreak. We measured how

participants weighed the perceived threat of the direct health hazards posed by the disease relative to two possible downstream costs of protective behavior: the economic fallout of the pandemic, and the perceived loss of personal liberties resulting from public health directives. Using 1 to 7 Likert-type scales, health-domain items included concern about contracting and spreading COVID-19 (e.g. "How concerned are you about…. Personally getting COVID-19 … Transmitting COVID-19 to a family member"), estimates of the health risks posed by infection (e.g., "How severe would the consequences of catching COVID-19 be to… your own health"), as well as questions regarding whether participants thought the threat of the pandemic was overblown, or would quickly pass (e.g., "Please indicate how strongly you agree or disagree with each of the following statements … I think that the threat of COVID-19 is overblown"). Economic and personal liberty-related items included self-reported concern over those issues (e.g., "How concerned are you about … losing personal liberties because of COVID-19 lockdown orders"), focus on defending personal liberties (e.g., "During the COVID-19 outbreak, how focused are you on doing the following … speaking out to defend personal liberties"), efforts to acquire guns and ammunition (e.g., "Within the last 10 weeks, it has been important to me that [I/my household] make an effort to stock up on … guns and ammunition"), and beliefs that the economic and personal liberty costs of the pandemic outweighed the health ones (e.g., "Please indicate how strongly you agree or disagree with each of the following statements ….I think that the economic costs of the COVID-19 response outweigh the public health benefits"). We created a reliable COVID-19 domain-specific threat-assessments composite based on these items (αs = .89 – .90). Health domain items were reverse scored, such that higher scores indicated finding the

direct health consequences of the pandemic less serious, particularly in contrast to downstream threats to personal liberties and the economy.

3 Economic precautions: Participants were asked about the extent to which they were preparing for an economic downturn (e.g., "During the current COVID-19 outbreak, how focused are you on doing the following … reducing discretionary spending"). We averaged these behavior items into a composite scale, which was reliable (αs = .75 – .78).

4 Perceived prevalence of COVID-19: Participants gauged COVID-19 prevalence within their local communities, including their estimates of the current incidence, their neighborhood's density, and how many people they knew who had contracted COVID-19.

5 Political leadership assessments: Participants provided a series of assessments on a 1 to 7 Likert scale from "worst possible response" to "best possible response" about the effectiveness of the President, Congress, and the participant's state and local governments in their responses to the COVID-19 pandemic.

6 Additional items: As single items, participants also rated their perceived likelihood of contracting COVID-19 (e.g., "How likely do you think the following people are to become ill with COVID-19 … myself), the severity of the economic consequences they faced as a result of the pandemic (e.g., "How severe are the current economic consequences you face because of the COVID-19 outbreak?"), and their concerns about being able to access healthcare (e.g., "How concerned are you about … needing to seek in-person medical care for non-COVID related reasons?"). Additionally, if participants engaged in prophylaxis, they indicated whether those behaviors were primarily motivated out of concern for their own health or that of others, (e.g., "How much do you engage in

these protective behaviors out of concern for your own health?"). Finally, participants were asked to indicate whether they had been infected with COVID-19, and, if so, whether they were still ill.

News consumption

Participants indicated hours per week spent consuming news of any kind, then frequency (on a 1 to 7 Likert scale, from "never", to "very frequently") with which they attended to specific news outlets with unambiguous partisan leanings. Using Allsides Media Bias ratings, we assigned each news source to one of three composite measures based on its externally rated partisan lean: *liberal-leaning media consumption* (e.g., MSNBC; $\alpha s = .88 - .89$), *moderate-leaning media consumption* (e.g., USA Today; $\alpha s = .65 - .68$), and *conservative-leaning media consumption* (e.g., Breitbart; $\alpha s = .87 - .89$). Because the moderate-leaning composite was unreliable, it was dropped from analysis.

Endorsement of public health interventions

To measure opinions about a government public health intervention outside of the pandemic context, —we gauged participants' agreement with the government's intervention in tobacco use using four face-valid items, rated on a 1 to 7 scale, and averaged into a reliable composite ($\alpha s = .78 - .80$).

Demographics and study checks:

Participants indicated their gender identity, ethnicity, age, belief in God or other deities, income, education, and preferred U.S. political party.

Results

All analyses of scale variables make the simplifying assumption that Likert scale data can be treated as interval.

Does COVID-19 precautionary behavior differ by political party?

After applying prescreening criteria, there were 906 participants in both Studies 1 and 2. In Studies 1 and 2, respectively, 424 and 413 participants identified as Democrats, 212 and 210 as Republicans, and 228 and 237 as Independents. Remaining participants—42 in Study 1, and 46 in Study 2—identified as members of the Green party, Libertarian party, or other. Because there were few self-identified supporters of the Green, Libertarian, and other American—precluding reliable detection of the effects of interest—they were excluded from analyses looking at party-specific effects. Given that these supporters are also at low frequency in the U.S., excluding these participants should not substantially impact the generalizability of results. Examining Democrats, Republicans, and political Independents, there was a significant effect linking party affiliation to levels of precautionary behavior in both studies (Study 1: $F[2, 860] = 12.8, p = < .001$; Study 2: $F[2, 857] = 12.8, p < .001$). Post hoc comparisons using the Tukey HSD test indicate that the mean precaution scores for Democrats (Study 1: $M = 5.18, SD = 1.02$; Study 2: $M = 5.22, SD = .98$) were significantly higher than those for Republicans (Study 1: $M = 4.81, SD = 1.24, p < .001$; Study 2: $M = 4.80, SD = 1.28, p < .001$) and Independents (Study 1: $M = 4.77, SD = 1.19, p < .001$; Study 2: $M = 4.91, SD = 1.08, p = .001$), but that precautions did not significantly differ between Republicans and Independents (Study 1: $p = .921$; Study 2: $p = .489$).

Do socially conservative political attitudes predict precautionary behavior?

Using linear regression with moderation, in both studies, COVID-19 prophylaxis associated with socially conservative political attitudes among Democrats, but not Republicans or Independents (Figure 1.01). Simple slopes analyses were performed to assess the conditional effects of socially conservative attitudes on precautions by political party. In both studies, these analyses showed that the conditional effects were significant among Democrats (Study 1: $B = .82$, SE $= .16$, $t(857) = 5.08$, $p < .001$; Study 2: $B = .74$, SE $= .15$, $t(854) = 4.98$, $p < .001$), but not Republicans (Study 1: $B = .02$, SE $= .24$, $t(857) = .09$, $p = .939$; Study 2: $B = -.05$, SE $= .21$, $t(854) = -.24$, $p = .809$) or Independents (Study 1: $B = .13$, SE $= .20$, $t(857) = .64$, $p = .520$; Study 2: $B = -.04$, SE $= .18$, $t(854) = -.23$, $p = .818$). That is, more socially conservative Democrats reported greater COVID-19 precautions relative to more socially liberal Democrats, however this relationship did not obtain among Republicans or Independents. Slopes did not significantly differ between Independents and Republicans (Study 1: $B = .11$, SE $= .31$, $t(857) = .35$, $p = .728$; Study 2: $B = .01$, SE $= .28$, $t(854) = .04$, $p = .969$). In sum, precautionary behavior was predicted by social conservatism among Democrats to a significantly greater extent relative to Republicans or Independents, who did not differ in this regard. This full pattern of results obtained in the Pilot Study as well (see Appendix 1).
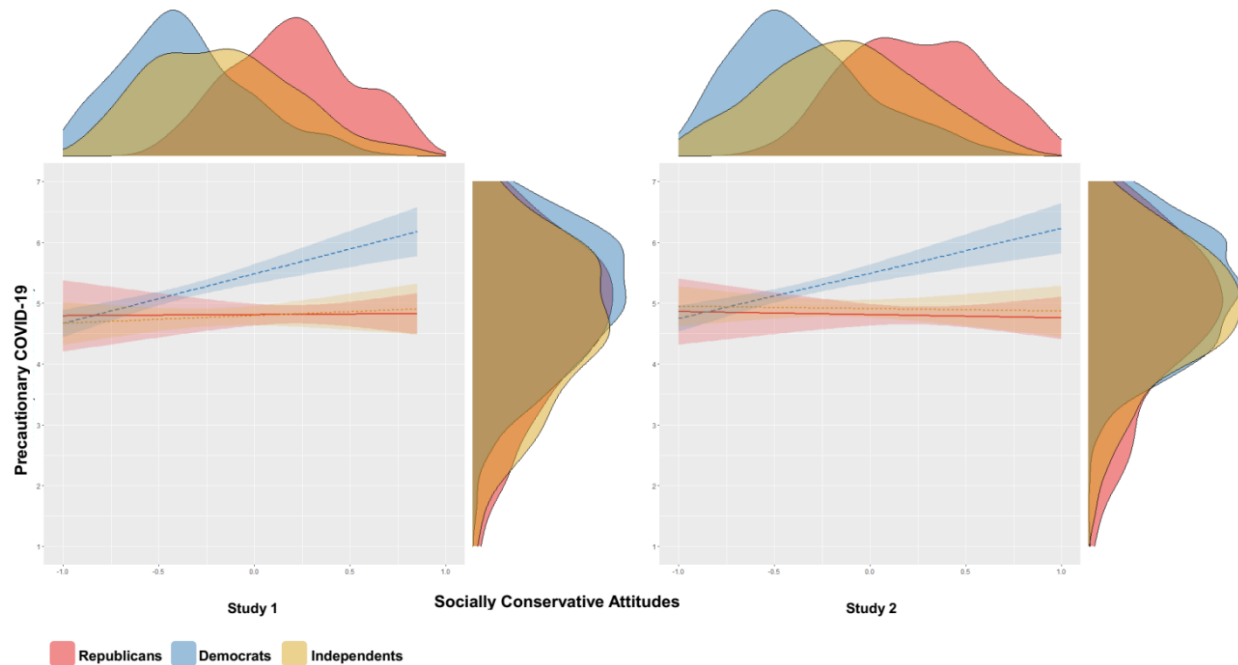
Fig 1.01 Relationship between socially conservative attitudes and COVID-19 precautions. Studies 1 and 2 conditional effects of moderated linear regressions in which COVID-19 precautions were regressed on the (centered) socially conservative attitudes composite, political party affiliation, and their two-way interaction. Bands around regression lines are 95% confidence intervals. The density plots along the x-axes represent the raw distributions of socially conservative attitudes by political affiliation. The density plots along the y-axes represent the raw distributions of precautionary behaviors by political party.

In sum, a primary prediction made by the traditional-norms account—that social conservatism and traditionalism should correlate with pathogen avoidance—is observed, but only among Democrats, raising several questions: 1) what drives partisan differences in the relationship between socially conservative attitudes and COVID-19 precautions? and 2) as predicted by the traditional-norms account, among Democrats, are social conservatism and traditionalism better predictors of precautions than other dimensions of political attitudes?

What drives partisan differences in the relationship between socially conservative political attitudes and COVID-19 precautions?

In order to explore what may be accounting for the observed partisan differences in the relationship between COVID-19 precautions and socially conservative attitudes, we considered the possibility that some variables—particularly those reflecting the partisan information environment dynamics and threat trade-offs discussed in the introduction—were statistically suppressing [54] an underlying relationship between precautions and socially conservative attitudes among Republicans and Independents. Specifically, though the traditional-norms account predicts an association between COVID-19 precautions and socially conservative attitudes, countervailing factors in this complex real-world context may suppress that relationship, potentially explaining the null association among Republicans and Independents reported above. Candidate variables were considered suppressors if they resulted in a significant and negative indirect pathway between socially conservative attitudes and COVID-19 precautions among Republicans and Independents. Additionally, we tested whether adjusting for suppressors would result in a) positive conditional correlations between socially conservative attitudes and COVID-19 precautions among Republicans and Independents, in contrast to the null associations at baseline, and b) non-significant interactions between socially conservative attitudes and party affiliation, such that slopes did not differ as a function of party affiliation.

In Study 1, we tested for suppression effects among Republicans and Independents across the full range of theoretically-motivated candidate variables that could plausibly be shaping partisan differences in precautionary COVID-19 behaviors, using a bottom-up exploratory approach. In order to qualify as suppression, a target variable had to have inconsistently mediated the relationship between socially conservative attitudes and precautionary behaviors

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among Republicans, resulting in a significant and negative indirect effect. Confidence intervals were bootstrapped for significance testing (see Appendix 1 for further details of analytic procedures, and full variable-by-variable results of the individual suppression tests).

Using this process, four variables were identified as possible suppressors among Republicans: the trust in scientists composite, the trust in liberal and moderate information sources composite, the liberal media consumption composite, and the economic conservatism composite. There was no evidence that other candidate variables were acting as suppressors, including domain-specific COVID-19 threat-assessments, and opinions about government interventions in another public health domain (smoking regulations).

In order to better visualize how these variables resulted in negative indirect effects between socially conservative attitudes and COVID-19 precautions, we regressed COVID-19 precautions on each suppressor variable, and their interactions with political party affiliation. The conditional effects were then plotted (Figure 1.02). In both studies, political party was a significant moderator of all four suppressor variables (see Appendix 1 for statistical details). In addition, greater trust in scientists, trust in liberals and moderates, and liberal media consumption were all positively correlated with COVID-19 precautions among Republicans and Independents. Greater economic conservatism was negatively correlated with COVID-19 precautions among Republicans and Independents (see Appendix 1 for statistical details). Further, in both Studies 1 and 2, socially conservative attitudes negatively associated with trust in scientists, trust in liberals and moderates, and economic liberalism among Republicans and Independents. Socially conservative attitudes negatively correlated with liberal media consumption among Republicans in both studies, but only among Independents in Study 2. See Appendix 1 for full details of these results.
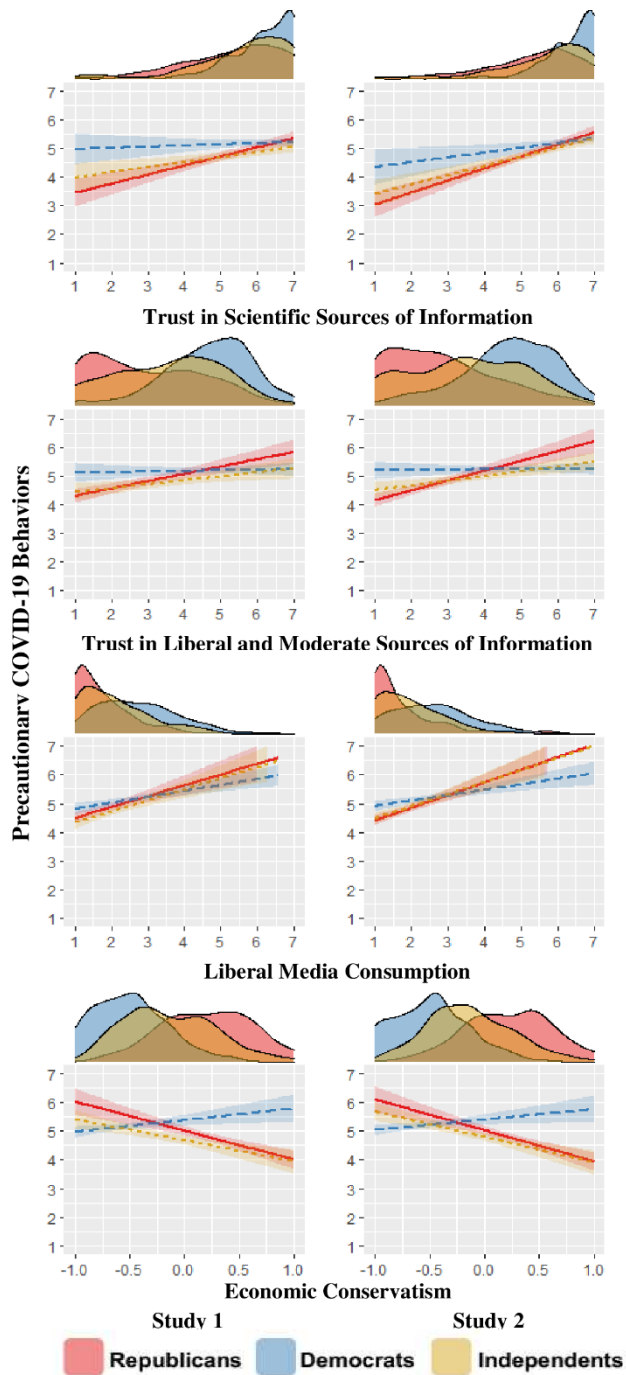
Figure 1.02 Relationship between suppressor variables and COVID-19 precautions. Studies 1 and 2 conditional effects of moderated linear regressions, in which COVID-19 precautions was regressed individually on each identified suppressor variable, political party affiliation, and the interaction between the suppressor and party affiliation. These (centered) suppressors were trust in scientists as information sources, trust in liberal and moderate figures as information sources, liberal media consumption, and economic conservatism. Bands around regression lines are 95% confidence intervals. The density plots along the x-axes represent the raw distributions of each suppressor variable by party affiliation.

In sum, these results illustrate the pathways by which these four variables act as suppressors of a socially conservative attitudes-precautions relationship among Republicans and Independents. First, more socially conservative attitudes were negatively correlated with greater trust in scientists and liberal and moderate sources, and greater liberal media consumption, while being positively correlated with greater economic conservatism. Second, engaging in fewer COVID-19 precautions was associated with lower trust in scientists and liberal and moderate sources of information, and lesser liberal media consumption, while being positively associated with greater economic conservatism. Taken together, these relationships result in suppression of a positive relationship between greater socially conservative attitudes and greater COVID-19 precautions among Republicans and Independents.

Because of the complex and multi-determined nature of the phenomena at hand, we considered the possibility that these four individual variables were jointly suppressing the precautions-socially conservative attitudes relationship among Republicans and Independents. Therefore, the following analyses test the combined suppressive effects of these variables.

First, we tested whether the combined effects of these four variables jointly suppressed the precautions-socially conservative attitudes relationship in Study 1. The combined indirect effect through the four candidate suppressors was negative and significant among Republicans and Independents (Republicans: bootstrapped unstandardized indirect effect = -.62, 95% CI [-.91, -.35]; Independents: indirect effect = -.43, 95% CI [-.72, -.18]), demonstrating suppression. In Study 2, we sought confirmatory evidence for the suppression model arrived at in Study 1, testing whether the combined suppressive effects of the four previously identified variables replicated, without repeating the exploratory search process of Study 1. The significant and negative indirect effect through the candidate variables replicated (Republicans: bootstrapped

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unstandardized indirect effect = -.40, 95% CI [-.69, -.12]; Independents: indirect effect = -.77, 95% CI [-1.06, -.50]).

Next, we further examined the effects of the suppressor variables on the relationship between socially conservative attitudes and COVID-19 precautions. We tested whether accounting for the suppressors would result in positive conditional relationships between socially conservative attitudes and precautions among Republicans and Independents. In Study 1, there was a conditional positive effect of socially conservative political attitudes on precautions among supporters of all three principal party affiliations (Figure 1.03); a simple slopes analysis was performed to assess those conditional effects. The simple slopes analysis indicated that, after accounting for the effects of the suppressors, the conditional effects of socially conservative attitudes were significant among Democrats ($B = .69$, SE = .17, $t(820) = 3.97$, $p < .001$), Republicans ($B = .65$, SE = .25, $t(820) = 2.64$, $p = .008$), and Independents ($B = .62$, SE = .20, $t(820) = 3.09$, $p = .002$). However, we found only partial support for these conditional relationships in Study 2: after accounting for the suppressor variables, the conditional effects were significant among Democrats ($B = .69$, SE = .15, $t(812) = 4.58$, $p = < .001$) and Independents ($B = .69$, SE = .19, $t(812) = 3.66$, $p = < .001$), but only approached significance among Republicans ($B = .36$, SE = .20, $t(812) = 1.85$, $p = .065$). Further, after accounting for the suppressors, in both studies, slopes did not significantly differ between Democrats and Republicans (Study 1: $B = -.03$, SE = .30, $t(820) = -.10$, $p = .918$; Study 2: $B = -.33$, SE = .25, $t(812) = -1.34$, $p = .182$), Democrats and Independents (Study 1: $B = -.06$, SE = .27, $t(820) = -.24$, $p = .812$; Study 2: $B = .003$, SE = .24, $t(812) = -.01$, $p = .991$), or Republicans and Independents (Study 1: $B = -.03$, SE = .32, $t(820) = -.10$, $p = .920$; Study 2: $B = .33$, SE = .27, $t(812) = 1.21$, $p = .229$).
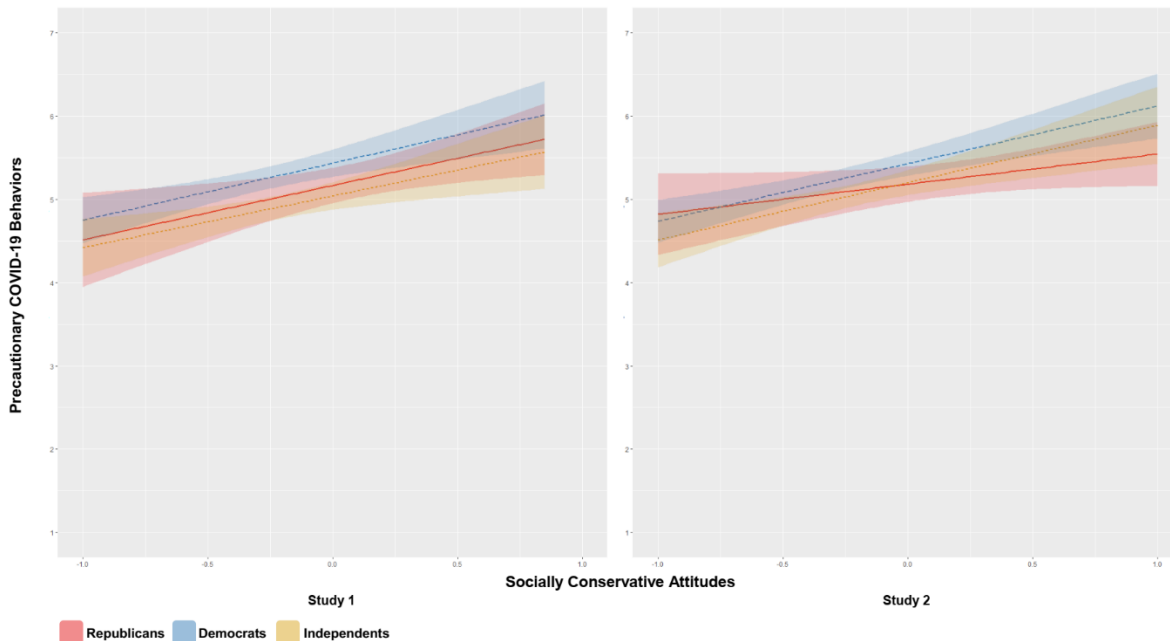
Figure 1.03 Effects of suppressor variables on the socially conservative attitudes-COVID-19 precautions relationship. Studies 1 and 2 conditional effects of moderated linear regressions, in which the previously-identified suppressor variables were added to the models specified in Fig 1. These (centered) suppressors were economic conservatism, trust in scientists as information sources, trust in liberal and moderate figures as information sources, and liberal media consumption. Further, each of these suppressor variables interacted with political party affiliation in the model, because they had different effects on precautionary behavior as a function of party identification (see Fig 2 and Appendix 1 for details). Bands around regression lines are 95% confidence intervals.

After including the suppressor variables, the party-specific socially conservative attitudes-precautions relationships were largely robust to the inclusion of basic demographic variables, as well as COVID-19-related covariates, which comprised of self-reported estimates of local COVID-19 prevalence, self-reported estimates of local population density, health status, whether participants' jobs required that they leave the home, and pathogen disgust sensitivity (see Appendix 1). The only effect that did not obtain following inclusion of these covariates was

the marginally significant conditional relationship between socially conservative attitudes and precautions among Republicans in Study 2.

Are the relationships between socially conservative attitudes and COVID-19 precautions attributable to other dimensions of ideological attitudes?

We measured multiple dimensions of political orientation and attitude in addition to socially conservative attitudes, such as social dominance orientation and submission to authority. All political measures were highly correlated with each other, and many also correlated with COVID-19 precautions (see Appendix 1). Accounting for the effects of the suppressor variables, the correlations between socially conservative attitudes and COVID-19 precautions among supporters of all three major party affiliations were robust to the inclusion of the additional political ideology measures in Study 1 (see Appendix 1). In Study 2, however, including the additional ideology variables in the moderated regressions rendered the correlation between socially conservative attitudes and COVID-19 precautions non-significant among Republicans. However, those relationships remained significant among Democrats and Independents (see Appendix 1). Concordantly, socially conservative attitudes were the strongest positive ideological correlate of precautions among Republicans, Independents, and Democrats in Study 1, but only among Democrats and Independents in Study 2 (see Appendix 1). Taken in sum, these results suggest that other ideological dimensions do not account for the positive socially conservative attitudes-precautions relationship, although the evidence is more consistent among Democrats and Independents relative to Republicans.

Disgust sensitivity, politics, and precautionary COVID-19 behaviors

As noted above, pathogen disgust sensitivity did not account for the relationship between socially conservative attitudes and precautionary COVID-19 behaviors. We also tested whether pathogen disgust sensitivity was associated with COVID-19 precautionary behaviors using moderated linear regressions, where precautionary behaviors was regressed on the interaction between political affiliation and pathogen disgust sensitivity. We then performed simple slopes analyses, finding that, sensibly, in both studies, disgust sensitivity associated with precautionary behaviors among Democrats (Study 1: $B = .20$, SE = .05, $t(856) = 4.22$, $p < .001$; Study 2: $B = .24$, SE = .05, $t(854) = 4.98$, $p < .001$), Republicans (Study 1: $B = .36$, SE = .06, $t(856) = 5.63$, $p < .001$; Study 2: $B = .23$, SE = .07, $t(854) = 3.51$, $p < .001$), and Independents (Study 1: $B = .40$, SE = .06, $t(856) = 6.64$, $p < .001$; Study 2: $B = .27$, SE = .06, $t(854) = 4.41$, $p < .001$). We then used the same moderated linear regression technique to assess the relationships between pathogen disgust sensitivity and socially conservative attitudes. However, while disgust sensitivity positively correlated with socially conservative political attitudes among Democrats in both studies, as well as Independents in Study 2, there was no significant correlation among Republicans in either study, or among Independents in Study 1 (see Appendix 1), contrary to the literature on political differences in pathogen avoidance. Because of the conceptual similarity between these results, and the party-specific effects of socially conservative attitudes on COVID-19 precautions, we tested whether economic conservatism, the trust composites, and the liberal media consumption composite were also acting as suppressors here; suppression did not account for the null association among Republicans (see Appendix 1).

Discussion

Partially consonant with the traditional-norms account of the relationship between political orientation and pathogen threat reactivity, in two studies, traditionalism and social conservatism correlated with COVID-19 precautionary behaviors, but the theorized relationship held only among Democrats. There was evidence that, after controlling for suppressors, these correlations appear among Republicans and Independents as well, although these findings were less robust in Study 2 than Study 1. These results are broadly consistent with previous findings that relationships between pathogen avoidance and socially conservative attitudes are stronger among liberals than conservatives [55]. We did not find support for an alternative possibility, raised in the introduction, that traditions may clash with public health COVID-19 precautions, thus resulting in a negative correlation between socially conservative attitudes and precautions. Simultaneously, however, the suppression of simple effects relating precaution behavior to socially conservative attitudes among Republicans and Independents indicates that clashing trade-offs between various threat domains can alter the relationships predicted by the traditional-norms account. Among Republicans and Independents, lower trust in scientists or in liberal and moderate sources, lower consumption of liberal news, as well as greater economic conservatism, appear to suppress a precautions-socially conservative attitudes association. Below, we consider possible explanations for these patterns.

Conservative politicians and news media have expressed greater doubt concerning the seriousness of the outbreak, and Republicans are less likely to trust scientists concerning COVID-19 [56]. Republicans and Democrats thus potentially occupy differing social-network and corporate-media information environments that correspond with divergent cost-mitigating responses to the pandemic. Importantly, the general relationship between media consumption

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and beliefs appears bidirectional. On the one hand, news content causally shapes partisan perspectives, particularly as regards beliefs about scientific issues [42,57]. On the other hand, individuals select and trust news sources that accord with their prior views [58].

Long before the current pandemic, prominent U.S. conservatives and conservative media aggressively cast doubt on science [59], and, correspondingly, trust in science has declined among conservatives in the United States over the past four decades [60]. With regard to social conservatism, these longstanding patterns may partly owe to negative relationships between religiosity and acceptance of science [61]. With regard to economic conservatism, these patterns may partly owe to conflicts between capitalism and public-goods issues such as the societal costs of tobacco use or the shared risk of climate change.

Notably, we find that the suppressive effects of information on a positive relationship between socially conservative attitudes and prophylaxis operate not via greater trust in conservative voices, but rather via reduced trust in science, scientists, and liberal and moderate media. Because many conservative voices both question the legitimacy of scientific findings and dispute the veracity of related liberal and moderate reporting, similar considerations may apply with regard to the erosion of trust in said media, with corresponding suppressive effects on the relationship between socially conservative attitudes and COVID-19 prophylaxis.

Republicans generally report being more concerned than Democrats about the economic fallout of the pandemic [62]. We find that economic conservatism correlates with lower prophylaxis among Republicans, suggesting that more economically conservative Republicans may discount the direct health risks of the COVID-19 outbreak relative to economic considerations. Indeed, among Republicans, economic conservatism negatively correlated with concern over the direct health consequences of the pandemic (see Appendix 1). Further, economic conservatism appears

to contribute to the suppression of an underlying relationship between socially conservative attitudes and precautionary behaviors among Republicans, revealing a conflict between economic considerations and reaction to the pathogen threat posed by COVID-19. We did not find evidence that Republicans were more likely than Democrats to report taking personal steps to buffer themselves against the potential economic consequences of the pandemic (see Appendix 1). This may be because their buffering efforts are focused on behaviors such as protesting public health orders, rather than on the economic precautions we measured; alternatively, the perceived conflict between economic considerations and responses to the health threat of COVID-19 may be primarily ideological in nature. Informational considerations may also bear on the interacting effects of economic and social conservatism in shaping prophylactic behaviors. By virtue of shared coalitional membership, the priorities of Republicans for whom economic conservatism is paramount may color the information environment or valuations of Republicans for whom social conservatism looms largest. Addressing the concerns of powerful U.S. economic conservatives, conservative leaders and media, and other coalitional supporters in Republican social networks may prioritize the economic dangers of lockdowns and aid appropriations over the health threats of COVID-19; this may then influence social conservatives' perceptions.

These results are also consistent with the possibility of a conservative shift among more threat-sensitive Democrats, but not Republicans or Independents, in response to the pandemic. This is in contrast to previous research, which found that real-life threats in the U.S. resulted in conservative shifts among Republicans, Independents, *and* Democrats [24], findings which might have predicted a similar pattern of results across political affiliations in response to COVID-19. The suppressor variables that were observed among Republicans and Independents

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could plausibly be responsible for a lack of a socially conservative shift among members of those political affiliations. Specifically, as our present data show (see Appendix 1), lower trust in scientists and liberal and moderate information sources, lower consumption of liberal media, and higher economic conservatism appear to clash with the perception that COVID-19 poses a substantial health threat. This diminished perception of hazard may weaken compensatory threat responses in social conservatives. This speaks to the importance of context-specific factors and trade-offs in structuring the relationship between threat cues and facultative shifts in socially conservative attitudes.

Regarding pathogen avoidance more broadly, we found that disgust sensitivity correlates positively with precautionary COVID-19 behaviors across individuals of all major U.S. political affiliations. Disgust reactivity is thus implicated in responses to this real-world pathogen threat, suggesting that theories such as the traditional-norms account can be justifiably applied to, and tested in relation to, this pandemic. However, socially conservative attitudes remained a robust predictor of prophylaxis after controlling for disgust sensitivity, hence precautionary behaviors aimed at avoiding COVID-19 do not appear to be fully explained by disgust responses. Measures of pathogen disgust sensitivity, including that which we employed, do not specify a context for confronting the pathogen threat, and hence the costs of avoiding the threat are unclear. In contrast, the costs of avoiding COVID-19 are real and substantial, and may be expected to vary significantly across individuals. Finally, while disgust sensitivity correlated with social conservatism among Democrats, it did not consistently do so among Republicans or Independents. Although much prior research documents a consistent and robust correlation between socially conservative attitudes and disgust sensitivity [21], our findings with regard to

party affiliation are consistent with work reporting a stronger correlation among liberals than conservatives [55].

Our research is limited in important ways. First, although we found evidence that factors such as greater economic conservatism, and lower trust in scientists and liberal and moderate sources, suppressed a relationship between socially conservative attitudes and COVID-19 prophylaxis among Republicans and Independents, some of these effects did not consistently obtain. In Study 1, controlling for the combined effects of the suppressors yielded a significant positive relationship between precautionary behaviors and socially conservative attitudes among members of all major U.S. parties. However, in Study 2, accounting for the suppressors resulted in a significant relationship solely among Independents and Democrats, while that relationship only marginally approached significance among Republicans.

Second, because of the cross-sectional, correlational, non-experimental design of the research, it is impossible to draw definitive conclusions regarding causal relationships between the phenomena of interest. However, future research could in part address these limitations. For example, in regard to the relationship between socially conservative attitudes and the suppressor variables, longitudinal research might investigate the extent to which partisan media environments shape beliefs and behaviors regarding different threats, versus the extent to which individuals seek out media environments that accord with their previous beliefs. Further, especially given the question of social conservative shifts during periods of threat, the direction of causality for the relationship between socially conservative attitudes and COVID-19 precautions found in this study is undetermined. For example, our results are consistent with the possibility of a socially conservative shift among Democrats most threatened by the pandemic; we cannot disentangle that causal pathway from one in which Democrats who were more

socially conservative to begin with responded to the pandemic with greater threat avoidance. Again, longitudinal research may provide leverage on this issue. Alternatively, experimental elicitations of threat could also probe the question of directionality. However, it would be difficult to build the real-world contextualizing factors found in this study into an experimental design, thus limiting the inferential value. Finally, society-level data on the relationship between traditionalism and COVID-19 precautions may also shed light on the underlying causal relationships between the variables of interest.

Third, Republicans were slightly underrepresented in the final samples, resulting in minor power limitations when examining party-specific effects among supporters of the Republican party. Future studies should include larger samples of this group.

Fourth, we measured traditionalism using abstract questions that gauge participants' attitudes toward culture change broadly. An approach that emphasizes real behavior—the traditions that people practice, their willingness to break conventions, etc.—would offer more general validity. Fifth, MTurk samples are not fully representative of the broader population, potentially biasing results. Likewise, the large number of surveys taken by highly-rated MTurkers such as those we employed might bias their responses. Finally, data quality can also be an issue with MTurk samples. For example, if participants are inattentive and rush through the survey in order to collect payment as quickly as possible, or if users deploy automated bots to take the survey. Despite these limitations, MTurk samples are plausibly valid for our present purposes. First, MTurk samples tend to be more diverse and attentive compared to other samples of convenience [63], and tend to replicate research conducted in population-based samples [64]. Further, and more germane to this research, psychological differences between liberals and conservatives in MTurk samples generally reflect those same differences measured in more representative

samples [64]. In regard to data quality, we pre-screened for high-reputation workers—which has been shown to have a strong positive effect [65]—used re-captcha at the beginning of the survey to exclude automated bots, and included multiple attention checks. Further, attention has not been found to be worse among MTurk participants compared to participants from high-quality commercial samples, and rigorous exclusion criteria such as ours tend to increase power without compromising the sample [66].

Sixth, because population density may be a salient cue for possible exposure to SARS-CoV-2 and thus the need to engage in prophylaxis, and because Republicans and Democrats on average differ in the density of their local communities, it is possible that said differences could account for our party-specific results. However, this is unlikely given that controlling for perceived population density and COVID-19 prevalence did not account for the party-specific relationships between precautions and socially conservative attitudes.

Seventh, the dynamics studied here were only examined in the U.S., limiting the generalizability of the results. The pandemic is a global event, and questions of threat sensitivity and attitudes toward change are relevant everywhere. Indeed, although we examined political orientation in these studies—which corresponds to a particular set of social issues that are localized to a specific time and place—there are theoretical reasons to believe that traditionalism and pathogen avoidance ought to associate beyond Democrats in the U.S. political context. Therefore, the overall generalizability of our test of the real-world validity of the traditional-norms account of the relationship between socially conservative attitudes and pathogen avoidance is limited by the lack of cross-cultural corroboration. Future work must address these same questions using cross-cultural research, particularly in nations where partisan responses to the COVID-19 outbreak

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have differed from those in the U.S., as well as in societies having different political and social structures, especially in regard to the value placed on traditional practices.

Our work has noteworthy strengths as well. Whereas most research on the relationship between threat sensitivity and political orientation has utilized abstract measurements that ask participants to imagine a variety of hypothetical scenarios, we asked about real behaviors in response to a widespread real-world pathogen threat, entailing actual costs and trade-offs. Socially conservative attitudes were the strongest positive predictors of precautionary behaviors relative to other dimensions of conservatism, thus our studies provide convergent real-world evidence for the traditional-norms account of the conservatism-pathogen avoidance relationship.

Further, since the start of the COVID-19 pandemic, a large body of scholarship has emerged looking at the effects of partisanship and political orientation on COVID-19 precautions and concerns in the United States [4,40,67,68]. However, many of these studies do not differentiate between political orientation and partisan identity, nor do they consider the potential interaction between them, nor examine suppressor variables linked to partisanship. These studies conclude that conservatism broadly negatively predicts COVID-19 precautions and concern. However, this result is potentially superficial, as it may owe variously to a) treating social conservatism/liberalism as isomorphic with political party affiliation; b) failure to measure distinct dimensions of ideology, such as social conservatism/liberalism, and economic conservatism/liberalism; c) failure to consider whether the effects of conservatism vary as a function of partisanship; and/or d) failure to assess suppressor variables linked to partisanship. In contrast, our results indicate that complex interactions between party affiliation and political ideology produce relationships between conservatism and COVID-19 precautions that run counter to the common assumption that conservatism is negatively associated with COVID-19

precaution. Our findings thus suggest that, both in research regarding COVID-19 and politics in the United States, and in a wide variety of related investigations, it is advisable to treat ideology and party affiliation as potentially non-substitutable, interacting variables.

Our results indicate that variation in precautionary responses to the pandemic relates to competing influences of various aspects of individuals' ideological preferences and attitudes toward change, their trust in assorted sources of information that vary along partisan dimensions, as well as the relative primacy of economic considerations. In particular, it appears that competing political factors, media consumption choices, and differences in trust may be affecting what may be underlying relationships between traditionalist social attitudes and sensitivity to pathogen threats. We speculate that Republicans—relative to Democrats—are likely exposed to and/or seek out informational environments that minimize the direct consequences of COVID-19. Instead, these informational environments may emphasize threats that resonate more strongly with the economic and libertarian dimensions of conservatism that also characterize the Republican party. These dynamics may have been amplified by the looming 2020 U.S. general election, where political and media elites in the Republican party may have been particularly motivated to downplay the threats and costs associated with the pandemic because of the potential for negative electoral consequences. As a result, an underlying relationship between socially conservative attitudes and heightened threat sensitivity may be suppressed, likely because these additional factors clash with pathogen avoidance motivations.

The present results are in tension with the current tendency to construe American partisan responses to the pandemic as defined along a simple left-right axis, where relatively liberal individuals have responded to the direct threat posed by the outbreak with greater precautions than have more conservative ones. Instead, we find that the relationship between political

attitudes and reactions to the pandemic in the U.S. is complex and non-linear, such that among certain groups of individuals (i.e., Democrats) but not others (i.e., Republicans), socially conservative political attitudes are in fact associated with *greater* COVID-19 precautions— the individuals reporting taking the fewest precautions are actually more politically progressive on social issues. Lastly, we find that trust in science—and in media sources that endorse science—is associated with individual health behaviors that impact the welfare of society at large. Looking beyond the current crisis, wide variation in such trust has important implications for how the global community can best confront other worldwide threats.

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CHAPTER 2

Greater Traditionalism Predicts

COVID-19 Precautionary Behaviors

Across 27 societies[2]

Abstract

People vary both in their embrace of their society's traditions, and in their perception of

hazards as salient and necessitating a response. Over evolutionary time, traditions have offered

avenues for addressing hazards, plausibly resulting in linkages between orientations toward

tradition and orientations toward danger. Emerging research documents connections between

traditionalism and threat responsivity, including pathogen-avoidance motivations. Additionally,

because hazard-mitigating behaviors can conflict with competing priorities, associations between

traditionalism and pathogen avoidance may hinge on contextually contingent tradeoffs. The

COVID-19 pandemic provides a real-world test of the posited relationship between

traditionalism and hazard avoidance. Across 27 societies ($N = 7{,}844$), we find that, in a majority

of countries, individuals' endorsement of tradition positively correlates with their adherence to

costly COVID-19-avoidance behaviors; accounting for some of the conflicts that arise between

public health precautions and other objectives further strengthens this evidence that

traditionalism is associated with greater attention to hazards.

Introduction

Traditionalism—the tendency to embrace what are perceived to be the longstanding norms and values of one's group, while rejecting changes to them—varies across individuals[1]. Given the centrality of sociality and culture for humans, individuals' orientations toward traditions have important downstream consequences. These include the tendency to embrace or reject innovations in the face of environmental change[2], the ability to coordinate actions with fellow group members[3], and the shaping of political attitudes and ideologies in democratic contexts[4]. It is therefore vital to understand factors that contribute to variation in traditionalism.

Emerging research demonstrates associations between individual differences in traditionalism and variation in the propensity to attend, and respond, to hazards[3,5]. Initial evidence indicates that individual variation in traditionalism may in part associate with variation in pathogen avoidance, the motivation to take actions to alleviate the costs of potential pathogen threats[3,6–10]. Hence, what is termed the *traditional norms* account[7] identifies pathogen avoidance as an important factor relating to traditionalism. Consistent with the traditional norms account, multiple evolutionary pathways may lead individuals to leverage adherence to tradition as a way of ameliorating danger[3,7].

First, as a result of cultural evolutionary processes favoring beliefs and practices that benefit individual and group fitness[11], some traditions may have instrumental value for addressing particular pathogen threats[12]. While it is possible that individuals explicitly or implicitly understand the connections between some instrumental norms and their outcomes, the functionality of norms is frequently opaque to those who adopt them[13,14]. If the average instrumental benefit of adhering to traditions when confronting danger outweighs the costs of imprecision resulting from causal opacity, then individuals may be motivated to broadly embrace

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traditions in pursuit of safety. Co-evolution may have resulted in psychological adaptations or reaction norms connecting traditions to threat if the above cost-benefit structure was common over evolutionary time.

The benefits of sociality generate a second pathway by which an association between traditionalism and the salience of pathogen threats could arise. Adherence to traditional norms might provide broad payoffs via increased social support, for example by signaling in-group identity in cooperative exchanges and systems of indirect reciprocity, and/or by facilitating in-group coordination[15–17]. Such benefits might plausibly include cost amelioration in the face of pathogen threats, for example by obtaining care and resources during periods of illness[18].

For all of the above possibilities, natural selection could have produced either a) stable dispositional linkages between pathogen-threat concerns and long-term preferences for tradition, b) facultative plasticity, such that individuals prophylactically upregulate their embrace of tradition in response to cues indicating an increased risk of disease, or c) both. Together, these considerations generate the prediction that, ceteris paribus, relative to individuals less invested in tradition, those who evince greater traditionalism will be more inclined to attempt to diminish the risk of acquiring transmissible disease.

Note that the theorized connection between traditionalism and threat avoidance mirrors a similar putative relationship between social conservatism and threat avoidance, where socially conservative beliefs reflect support for tradition [see 19,20] in contexts where people hold political ideologies. Indeed, much of the theoretical work connecting traditional attitudes with threat reactivity comes out of political psychology, where extensive prior research has long recognized the role that motives to mitigate uncertainty, fear, and threat—particularly disease threats and

threats to the stability of the social system—play in shaping socially conservative ideology[19,21–23].

In the present research, our focus is on traditionalism writ large rather than social conservatism in particular. Political ideologies are culturally relevant in some contexts but not others. In contrast, by virtue of their translatability across cultural and political contexts, attitudinal antecedents such as traditionalism are better suited for large-scale cross-cultural investigation. That said, the underlying evolutionary logic presented here draws on, and is consistent with, seminal theoretical perspectives in political psychology that identify the existential motivations (compare to the proximate motivation to reduce threat), epistemic motivations (compare to the potential instrumental value of traditionalism/conservatism in reducing threat), and relational motivations (compare to the potential sociality benefit of traditionalism/conservatism in reducing threat) that underly political ideologies [24].

Although adherence to tradition can provide benefits, it can also entail costs. In addition to political considerations, there are often tangible costs to sticking to the tried-and-true – most notably because innovations may generate higher payoffs than existing practices. Any given manifestation of a linkage between threat-mitigating behavior and traditionalism may therefore depend in part on how individuals assign weights to the cost-benefit structure characterizing the specific context, and exceptions to that connection should be expected when competing priorities arise. Moreover, behaviors that mitigate the costs of a threat may lead to costs in other areas, either directly, or indirectly due to the zero-sum nature of the time, attention, and resources available. Taken in sum, the relationship between traditionalism and pathogen avoidance may not be straightforward if responses to pathogen threats are perceived to clash with other priorities.

Much of the previous literature on the relationship between traditionalism and pathogen avoidance does not take account of the costs of the latter. Investigators often rely on subjective responses to hypothetical scenarios[e.g. 19, 20]—for example, feeling sick after witnessing someone vomit—that do not distinguish the real-world contexts, conflicting goals, or costs of the relevant behaviors (such as opportunity costs, allocation tradeoffs between—or vulnerabilities to—different threats, etc.). Using hypothetical scenarios is sensible in research that aims to measure emotional and/or behavioral tendencies—which may correlate with general behavioral tendencies[27]—while holding contextual factors equal. However, hypotheticals cannot capture the specific tradeoffs that likely determine how such propensities play out in consequential real-world decision making.

Past research predominantly employs samples from a narrow range of societies. Given that cost-benefit structures are likely culturally variant, the observed associations between traditionalism and pathogen avoidance may be rooted in aspects of particular practices, values, or beliefs within those societies. Hence, at present, the extent to which traditionalism and threat-avoidance behaviors are related across the highly variable traditional practices and beliefs of diverse societies is not fully known.

Encouragingly, research has begun to take the costs of pathogen avoidance into account[10,28,29]. Likewise, though relying on hypothetical scenarios, a recent study examined the relationship between disgust sensitivity and traditionalism in a large cross-cultural sample [7]. However, to date, no large-scale international investigation has addressed the relationship between pathogen avoidance and traditionalism in a real-world context, or assessed the potential for conflicts between pathogen avoidance and competing goals to impact said relationship. The COVID-19 pandemic affords such research.

The pandemic involves a pathogen threat that is both salient for much of the world's population[30] and has had marked effects on behavior[31]. Further, these real-world behaviors are inherently costly[32], and may epitomize the kinds of cost-benefit tradeoffs individuals face when various priorities are perceived to clash. Moreover, individuals are influenced by their information environments, which can in turn shape perceptions of costs and benefits regardless of the actual underlying distribution. Concordantly, from an error management perspective [33], individuals must balance the relative costs and frequencies of type 1 and type 2 errors when it comes to disease threats (i.e. the cost of taking insufficient precautions against a hazardous disease versus the social and opportunity costs entailed by being overly cautious). Indeed, individuals appear to be influenced by decision processes that reduce the probability of committing the more costly error in the context of disease avoidance [34,35]. In addition to the tradeoffs between disease avoidance and social opportunities, in social ecologies wherein COVID-19 precautions are positively or negatively moralized, error-management considerations will likely also include the reputational costs of locally counter-normative behavior.

The traditional norms account of the relationship between traditionalism and threat avoidance predicts that, all else equal, precautionary COVID-19 health behaviors should correlate with traditionalism, given that such behaviors can accurately index general pathogen avoidance motivations by virtue of occurring in a real-world context. Specifically, if traditionalism and pathogen avoidance motivations are linked, then the extent to which individuals engage in COVID-19 prophylaxis should correspond with the extent to which they embrace traditions.

Despite the apparent simplicity of the above prediction, all else may not be equal in the case of reactions to the current pandemic, as group-level and individual-level contextual factors may parochially shape the perceived cost-benefit structure of COVID-19 health precautions. For example, at the group level, precautions promulgated by public health authorities may be seen as threatening economic prosperity or personal liberty to a greater extent in some cultural contexts than in others. Individual assessments of those countervailing tradeoffs, shaped by the social and political environment, will likely vary as well. Furthermore, some public health precautions may directly interfere with traditional practices; for example, social distancing restrictions preclude the kinds of ritual gatherings that are often important for religious services and other activities central to in-group identity. Finally, as stated above, individuals' characterizations of the cost-benefit structures may or may not be accurate: miscalculations or erroneous beliefs can arise. In particular, for politically, ideologically, and socially salient issues such as the pandemic, individuals' information environments may shape inaccurate beliefs about such tradeoffs. In sum, these clashes potentially reduce, or even reverse, the observed relationship between pathogen avoidance behaviors—in this case, COVID-19 health precautions—and traditionalism.

Recent research has found support for both the traditional norms account and the presence of tradeoffs. At the national level, consistent with the logic connecting traditions and threat mitigation, researchers have found that greater cultural tightness (i.e. stronger and more heavily enforced social norms and constraints) correlated negatively with COVID-19 incidence rates[36]. At the individual level, two recent studies in the U.S[10] found that variables such as greater economic conservatism and lower trust in scientists statistically suppressed the traditionalism-COVID-19 precautions relationship. Concordantly, consonant with the close relationship between traditionalism and social conservatism[4], other research provides evidence

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for an increase in social conservatism in the U.S., Poland, and the U.K. following the start of the pandemic[8,37–38, but see 39]. However, these results come from only three societies, and may be contingent on the parochial conditions obtaining therein, notably including the extensive politicization of the pandemic in the U.S. and Poland[40,41]. We therefore investigated the relationship between COVID-19 precautions and traditionalism across 27 countries, examining both the zero-order relationships and the direct relationships after statistically accounting for indirect effects (i.e., mediation or suppression) of variables related to the perception that COVID-19 precautions exacerbate other threats or otherwise conflict with competing priorities.

Research questions:

1. Do COVID-19 health precautions, as potential manifestations of general pathogen avoidance tendencies, positively correlate with traditionalism across diverse societies?

Our primary goal was to assess whether the hypothesis that traditionalism and pathogen avoidance covary at the individual level obtains across a wide array of cultural contexts. Specifically, we were interested in whether individuals' choices to adopt precautionary COVID-19 behaviors positively associated with their own endorsement of traditionalism. We used individuals' self-reports of their actual COVID-19 precautionary health behaviors (such as mask wearing, social distancing, and supplement taking) as a complex, real-world manifestation of pathogen avoidance behavior. We selected precautionary behaviors that had been widely adopted across the globe, and that had been plausibly viewed as medically- or public health-derived preventative measures by experts and/or laypeople. The actual efficacy of the precautions in question varied. In contrast to previous methods that left the costs of pathogen avoidance

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unspecified, individuals' decisions about COVID-19 precautions intrinsically embody the kinds of tradeoff calculations discussed above.

Because specific traditions and cultural practices vary substantially across societies, to measure traditionalism, we examined individuals' general tendency to endorse or reject the traditional norms and values of their society writ large, rather than the specific content of those traditions themselves. This allowed us to measure traditionalism in a relatively consistent manner across study sites, affording comparisons despite wide variation in the contents of traditions.

Testing the individual-level relationship between traditionalism and COVID-19 precautions across many cultural contexts was important for at least two reasons. First, given claims of an evolved link between traditionalism and general pathogen avoidance, it is critical to determine whether that relationship is evident across a broad swath of humanity. Second, given that clashes between pathogen avoidance and other priorities are likely often parochial as a function of different cultural values and beliefs, examining the individual-level traditionalism-pathogen avoidance relationship across many societies affords identification of overarching patterns despite local variation.

2. Do perceived tradeoffs between health precautions and other priorities influence the traditionalism-precautions relationship?

Parochial factors interacting with individual preferences may conceal direct relationships between pathogen avoidance and traditionalism. For example, a recent study found evidence that, in the U.S., greater economic conservatism, greater social dominance orientation (SDO), and lower trust in science statistically suppressed the direct precautions-traditionalism relationship[10]. Consistent with the importance of tradeoffs in shaping the relationship between

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pathogen avoidance and traditionalism, we expect such suppression to occur when competing priorities that also associate with traditionalism, such as personal liberties, are perceived to clash with COVID-19 precautions.

It is an open question whether, in other societies, individuals similarly weight the components of the cost-benefit tradeoffs previously identified in the U.S. On the one hand, many aspects of the U.S.' socio-political environment are unlikely to generalize beyond its borders. On the other hand, pathogen avoidance precautions—particularly in the case of COVID-19—may commonly be perceived to clash with benefits derived from social interaction, including both economic and community activity. Therefore, in the present study, we also sought to investigate the extent to which the suppressive dynamics identified in previous research in the U.S.[10] emerge across a much broader range of socio-political contexts.

Drawing on the previous research conducted in the U.S., we tested seven theoretically relevant variables that may suppress traditionalism-precautions relationships in some cultural contexts. First, we measured concerns over personal liberties and the economy, as well as perceived tradeoffs between personal liberties, the economy, and the practice of traditions on the one hand, and COVID-19 public health precautions on the other. Here, we explicitly pitted public health precautions against priorities that have been commonly perceived to clash in some societal contexts. Second, we measured trust in scientists regarding COVID-19 information. Because many scientific explanations for natural phenomena are incompatible with many traditional explanations thereof, trust in scientists may negatively correlate with traditionalism in many cultural contexts. If this is the case, and if COVID-19 public health precautions are perceived to derive from the advice of scientists, traditionalists may discount these precautions, resulting in suppression of any direct positive relationships between traditionalism and COVID-

19 precautions. The precise configuration, however, will depend on culturally parochial relationships between traditional and scientific meaning systems.

Finally, related to the logic regarding trust in scientists, we included a measure of SDO. SDO contributes to distrust in both scientists and various scientific findings, likely because scientists are more likely to be viewed as actors seeking to disrupt the social hierarchies preferred by individuals with higher SDO[42]. This may be particularly true when hierarchy-promoting authoritarian leaders denounce the legitimacy of scientists in the context of COVID-19, or imply that their recommended practices are only for the weak. Likewise, SDO may reflect preferences for fewer constraints on individual liberties regardless of their effects on public goods[43]. Because traditionalism also intersects with preferences for authoritarian leaders[1], and associates with SDO in some socio-political contexts[44,45], SDO might act as a statistical suppressor of any direct relationship between traditionalism and COVID-19 precautions when the above conditions are met.

We did not make specific predictions about the effects of each of the above variables at each of the study sites, and we did not expect to find suppression across all countries given the likelihood that many of these tradeoff dynamics are parochial. Further, this was not an exhaustive test of every possible dynamic that may be relevant to the zero-order relationship across individual societies. Rather, we sought to explore the generalizability of the extent to which the particular factors operating in the U.S. also exert suppressive effects elsewhere, perhaps reflective of some relatively common ways in which pathogen avoidance behaviors can clash with competing priorities.

Methods

Project overview:

This study was approved by the UCLA Office of the Human Research Protection Program, and all methods were performed in accordance with relevant guidelines and regulations. Informed consent was obtained before participation. Complete questionnaire in English, translations, datasets, analysis code, and preregistrations of predictions and methods are available at https://osf.io/6vu5b/?view_only=873259d429c346d2912303fc44df5079. See Appendix 2 for a list of questionnaire items and composite scales.

Adult participants were recruited online for an observational, cross-sectional survey-based study between October 2020 and July 2021 in 27 countries, with a final N of 7,844. Countries were selected on a convenience basis, and both the range of possible study sites and the representativeness of samples recruited at each were constrained by our use of remote internet-mediated interactions for recruitment and participation. Nevertheless, we endeavored to collect data in a wide range of societies, selected from diverse major culture areas; see Figure S1. Where appropriate, survey materials were translated from English by fluent bilingual speakers. While most participants were unpaid volunteers, recruitment and compensation schemes varied across study sites. A mix of non-student and student populations were used, depending on the study site. See Appendix 2 for a summary of study sites, study site-specific Ns, exclusions, as well as full information on survey languages, recruitment procedures, and participant demographics for each study site. Data were prescreened for minimum completeness and correct answers to attention checks.

Measures:

Measures were consistent across study sites, with some small deviations where necessary (e.g., items addressing education levels differed across study sites according to the local education structure). A full list of these differences can be found on the OSF repository (see link above).

COVID-19 health precautions:

COVID-19 health precautions were measured with a 13-item scale examining participants' self-reported real-world behaviors. Questions addressed behaviors which, at the time, were widely thought by public health authorities to have significant protective value against COVID-19 (e.g., the frequency of mask wearing, hand washing, and social distancing, as well as the importance to the participant of stocking up on supplies such as hand sanitizer). Items were rated on 7-point scales, either from "never" to "as often as possible", or from "not important at all", to "extremely important". Based on the results of an exploratory factor analysis (see Table S4), a composite COVID-19 health precautions variable was created for the purposes of analysis by averaging across the thirteen items. The factor analysis also revealed that this scale can be subdivided into two subscales: *external-facing health precautions* (e.g., observing mask wearing and social distancing), and *internal-facing health precautions* (e.g., washing hands). These factors are consistent with results from prior research on COVID-19 precautions[29]. Main text analyses report results using the combined composite, unless otherwise noted. See Appendix 2 for details on scale development and factor analysis.

Traditionalism:

Because we were unable to identify a culturally neutral traditionalism scale in the prior literature, we drew upon two instruments that had previously been deployed in large-scale cross-

cultural research. These scales jointly assessed the concept of traditionalism, or the tendency to endorse and place importance on the practice of traditional norms. To increase comparability across study sites, questions were designed to measure participants' general tendency to endorse or reject their own society's traditional social norms and values. The two scales were the conventionalism subscale of the Aggression-Submission-Conventionalism scale[51], which measures the general tendency to endorse one's society's traditional social norms without specifying the content of those traditions (e.g., "Traditions are the foundation of a healthy society and should be respected"), as well as items from the authority subscale from the Moral Foundations Questionnaire Short Version[52,53], which similarly assesses whether individuals respect traditions and authorities, both generally (e.g., "To what extent are the following considerations relevant to your thinking… Whether or not someone conformed to the traditions of society"), and in relation to specific values regarding gender and age roles (e.g., "Respect for authority is something all children need to learn"). Items were rated on 7-point scales, either from "Not at all relevant" to "Extremely relevant", or from "Strongly Disagree" to "Strongly Agree". After conducting an exploratory factor analysis on items from both scales jointly (see Table S7), a six-item averaged composite traditionalism variable was computed for analyses involving traditionalism. See Appendix 2 for details on scale development and factor analysis.

Potential suppressor variables:

We included seven variables related to potential perceived conflicts between COVID-19 health precautions and other priorities: distrust in science regarding the COVID-19 pandemic; SDO (measured using the 4-item short form scale[30]); concern about the effects of the COVID-19 pandemic on the economy and personal liberties; and perceptions that COVID-19 health precautions were clashing with personal liberties, one's own traditions, and the health of the

economy, respectively. Unless otherwise noted, these variables were measured using single items.

Demographics, COVID-19-related covariates, and attention checks:

Participants indicated their gender identity and age, and their income relative to others in their country. Education was also measured, but because different countries in the study have different educational systems, levels of education examined varied across study sites. For the purposes of analysis, education was therefore coded into a universal four-level structure: primary school, secondary school, undergraduate-level, and postgraduate-level. We also measured a number of covariates relevant to the pandemic itself, including perceived COVID-19 prevalence in participants' local communities; the population density of those communities; whether participants' jobs required that they leave the home; and whether participants had certain pre-existing medical conditions that may put them at higher risk for severe disease. Finally, we included several attention checks.

Results

Baseline relationships between COVID-19 precautions and traditionalism across study sites:

Treating each study site as a separate sample, we conducted a random effects meta-analysis to test the extent to which overall indices of COVID-19 precautions and traditionalism were related across study sites (see Figures 1 and 2). At the majority of study sites (16 of 27), the relationship between traditionalism and COVID-19 precautions was positive and significant, as was the overall meta-analyzed point estimate representing a weighted average of the effects found for each study site ($r = .19$, 95% confidence interval [.14, .24]; note that the 95% confidence interval for the overall estimate does not overlap with zero). There was also

substantial variation across study sites, as indicated by observed levels of heterogeneity (I^2 = 78.34%; 95% prediction interval [-.03, .41]); concordantly, the 95% prediction interval overlapped with zero, suggesting that if similar nations were randomly added to the sample, some of their true effect sizes would be null, or even negative[46].

These results were robust to the inclusion of demographic controls—including age and education—as well as COVID-19-related covariates, such as participants' estimates of COVID-19 prevalence (see Figure S5; see Methods section for details on COVID-19-related covariates). Additionally, the reliability of the traditionalism composite varied widely across study sites (αs .39 - .88, mean $\alpha = .74$; see Table S8). To address this, a) we performed item-by-item meta-analyses using each item from the traditionalism composite separately (see Appendix 2)—results were conceptually unchanged compared to the composite, and were similar across items, with some variation in effect size—and b) given the possibility of measurement error contributing to unreliability, we performed random effects meta-analyses using the traditionalism composite that disattenuated for unreliability[47], see Figure S7. These analyses used averages of raw scores to create composite indices for traditionalism and COVID-19 precautions, where item inclusion was based on the results of factor analyses (see Methods section and Appendix 2 for details). While averaged composites are easier to interpret, they may make unrealistic assumptions about the relative weights of each item in the composites. We therefore tested whether using factor scores instead of raw averages for the traditionalism and COVID-19 precautions indices conceptually altered the results. Factor scores were highly correlated with the raw average composites (marginal R2s = .96-.98), and using them in place of the raw average composites did not conceptually change results (see Appendix 2 for details). Finally, country-specific estimates of COVID-19 prevalence at the time of data collection did not explain any of the variance in

effect sizes between study sites when tested in a meta-regression (see Appendix 2), although the

reliability of officially reported prevalence numbers may vary across study sites.

Study Site | | | **Correlation [95% CI]**

Study Site	Weight	Correlation [95% CI]
United States	3.68%	-0.06 [-0.18, 0.07]
Canada	3.60%	0.01 [-0.12, 0.14]
Poland	4.68%	0.04 [-0.01, 0.09]
Austria	3.69%	0.04 [-0.08, 0.17]
Indonesia	3.74%	0.05 [-0.07, 0.17]
Slovakia	3.61%	0.09 [-0.04, 0.22]
Israel	3.79%	0.10 [-0.02, 0.22]
South Korea	2.99%	0.12 [-0.06, 0.29]
Kenya	3.08%	0.13 [-0.04, 0.30]
Singapore	3.27%	0.15 [-0.01, 0.30]
Qatar	3.19%	0.15 [-0.01, 0.31]
Turkey	4.04%	0.15 [0.05, 0.25]
France	3.42%	0.17 [0.03, 0.31]
Mexico	3.26%	0.17 [0.02, 0.33]
Lithuania	3.62%	0.18 [0.05, 0.31]
Netherlands	3.94%	0.20 [0.09, 0.30]
U.K.	3.98%	0.20 [0.09, 0.31]
Guatemala	4.25%	0.21 [0.13, 0.30]
Japan	3.69%	0.25 [0.13, 0.38]
Portugal	3.90%	0.28 [0.17, 0.39]
Denmark	4.04%	0.30 [0.20, 0.40]
Spain	4.18%	0.32 [0.22, 0.41]
Italy	3.30%	0.32 [0.16, 0.47]
Chile	3.69%	0.33 [0.20, 0.45]
Philippines	3.88%	0.36 [0.25, 0.47]
India	3.26%	0.38 [0.23, 0.54]
China	4.23%	0.44 [0.35, 0.53]
RE Model	100.00%	0.19 [0.14, 0.24]

Correlation Coefficient (x-axis: -0.4, -0.2, 0, 0.2, 0.4, 0.6)

Figure 2.01 Relationship between socially conservative attitudes and COVID-19 precautions across study sites. Results of a random effects, restricted maximum likelihood meta-analysis in which each study site was treated as a separate sample. Plot shows zero-order product-moment correlations between traditionalism and COVID-19 health precautions at each study site, ordered by effect size. For the individual country estimates, the location of the square along the x-axis corresponds with the correlation coefficient, the size of the square corresponds with the weight of that study site in the meta-analysis, and bands are 95% confidence intervals. At the bottom of the plot, an overall meta-analyzed point estimate is provided. The midpoint of the diamond corresponds with that point estimate, the width of the diamond corresponds with the 95% CI, and the dotted bands correspond with the 95% prediction interval. On the right side of the plot, weights, correlation coefficients, and 95% CIs respectively are numerically listed for both the site-specific correlations, as well as the overall estimate. Note that for the meta-analyzed point estimate, the 95% confidence interval does not overlap with zero, while the 95% prediction interval does.

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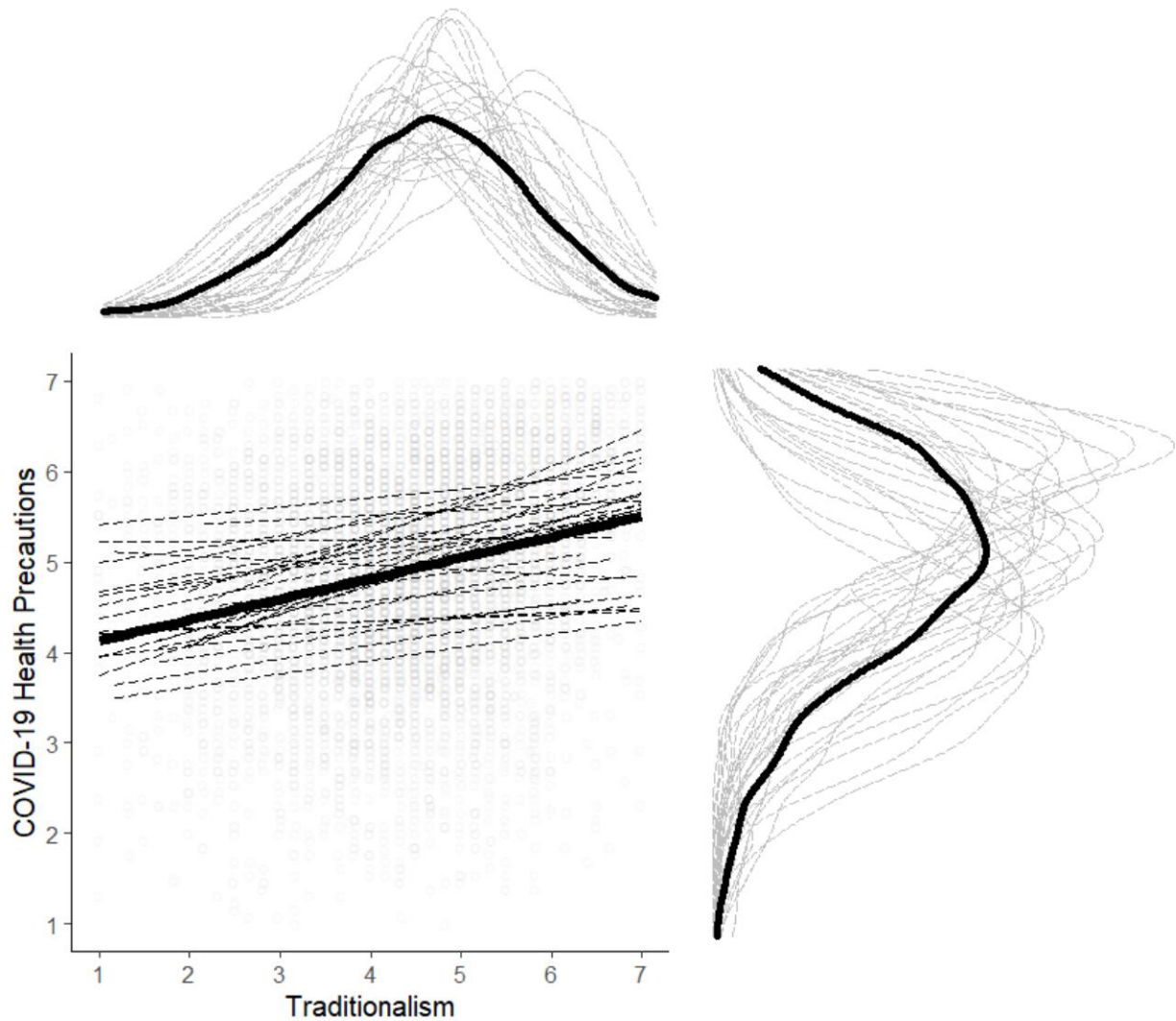
Figure 2.02 Graphical visualization of the relationship between socially conservative attitudes and COVID-19 precautions across study sites. Graphical visualization of the country-specific correlations listed in Figure 1. Dotted lines are study site-specific product-moment correlations between traditionalism and COVID-19 health precautions. The solid thick line is the unweighted product-moment correlation in the pooled sample across all study sites. Dots show individual data points, jittered along the x- and y-axes to aid interpretability. Density plots along the x- and y-axes represent the raw distributions of the traditionalism and COVID-19 health precautions composites. Thin grey lines show density distributions at individual study sites, whereas the thick black lines show the overall distribution in the pooled sample across all study sites. Study sites are unlabeled to improve readability. For labeled study-site specific correlations and density distributions, see Appendix 2.

Exploring the effects of potential suppressor variables:

To test the generalizability of suppression phenomena originally observed in the U.S. socio-political context, we examined the extent to which the potential suppressor variables assessed in those studies affected the zero-order precautions-traditionalism relationship across study sites. Here, suppression refers to variables that result in a negative indirect relationship between traditionalism and health precautions in a mediation analysis, such that accounting for them in a regression increases (rather than decreases, as in a traditional mediation analysis) the effect size of the direct positive traditionalism-precautions relationship[48]. We therefore conducted a second random effects meta-analysis on the traditionalism-precautions relationship accounting for the effects of potential suppressor variables.

In order to use the same set of candidate suppressors for each study site in the meta-analysis, we first identified suppressors in a pooled sample across all study sites. Using bootstrapping procedures to determine confidence intervals, we utilized mixed-effects mediation analyses with study site set as a random effect to test whether any of the seven candidate variables were suppressing the precautions-traditionalism relationship in the pooled sample. Of the seven variables, we identified five suppressors in the pooled sample (see Table A1.01): SDO; distrust in scientists; and perceived tradeoffs between COVID-19 public health efforts and personal liberties, the economy, and personal traditions, respectively. See Appendix 2 for information on mean levels of each suppressor variable across study sites.

Next, we assessed the combined effects of all five suppressors at each study site (see Appendix 2). We observed a wide range of indirect effects across study sites, ranging from suppression in slightly less than half of the study sites, all the way to partial mediation at three of the sites. This suggests that while the suppression effects originally observed in the U.S. *are*

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shared with some other societies, the effects of these five variables on the traditionalism-precautions relationship are parochial, and contingent on socio-political dynamics and perceptions that vary widely across societies.

We then ran a new set of random effect meta-analyses examining the relationship between traditionalism and overall COVID-19 health precautions, adjusting for the joint effects of the five aforementioned variables (see Figure 3). While the overall meta-analyzed point estimate was conceptually indistinguishable from the effect size of the zero-order meta-analysis, accounting for the five variables resulted in the following observations: a) the amount of heterogeneity in effect sizes across study sites was substantially reduced ($I^2 = 56.39\%$; 95% prediction interval [.08, .33]); b) the 95% prediction intervals suggest that if similar nations were randomly added to the sample, their true effect sizes would be positive and significant if adjusted for the five variables; and c) the traditionalism-precautions relationship was now positive and significant in 21 out of 27 study sites. Taken together, these results suggest that the suppressive effects of these five variables emerge in a variety of socio-political contexts across the countries included in this study, and adjusting for their effects reveals a more consistent positive relationship in the direct pathway between pathogen avoidance and traditionalism across societies in our models. Note that these results remain robust after accounting for the same demographic and COVID-19-related covariates used previously (see Figure S6), as well as when disattenuating for scale unreliability (see Figure S8); when using factor scores in place of raw average composites (see Appendix 2); and when conducting item-by-item analyses of the traditionalism composite items (see Appendix 2).

Study Site   **Correlation [95% CI]**

Study Site	Weight	Correlation [95% CI]
Indonesia	3.51%	0.05 [-0.07, 0.18]
Israel	3.75%	0.06 [-0.05, 0.18]
Kenya	2.50%	0.07 [-0.09, 0.23]
Canada	3.48%	0.08 [-0.04, 0.20]
United States	4.21%	0.12 [0.02, 0.22]
Qatar	2.69%	0.13 [-0.03, 0.28]
Singapore	2.78%	0.13 [-0.02, 0.28]
Slovakia	3.54%	0.13 [0.01, 0.25]
Austria	4.17%	0.13 [0.03, 0.23]
Turkey	4.30%	0.17 [0.07, 0.26]
Poland	6.10%	0.17 [0.13, 0.22]
Japan	3.50%	0.18 [0.06, 0.30]
Mexico	2.91%	0.21 [0.07, 0.35]
Lithuania	3.55%	0.21 [0.09, 0.33]
Denmark	4.27%	0.23 [0.13, 0.32]
Guatemala	4.94%	0.23 [0.15, 0.31]
France	3.14%	0.24 [0.10, 0.37]
U.K.	4.25%	0.24 [0.14, 0.34]
Netherlands	4.19%	0.25 [0.15, 0.35]
South Korea	1.82%	0.25 [0.05, 0.46]
India	2.60%	0.26 [0.10, 0.42]
China	4.50%	0.29 [0.19, 0.38]
Portugal	4.03%	0.30 [0.19, 0.40]
Italy	3.11%	0.30 [0.16, 0.44]
Philippines	3.75%	0.32 [0.21, 0.43]
Spain	4.83%	0.33 [0.25, 0.41]
Chile	3.58%	0.34 [0.22, 0.46]
RE Model	**100.00%**	**0.20 [0.17, 0.24]**

Semi-Partial Correlation Coefficient
(-0.4, -0.2, 0, 0.2, 0.4, 0.6)

Figure 2.03 Relationship between socially conservative attitudes and COVID-19 precautions across study sites accounting for suppressor variables. Results of a random effects, restricted maximum likelihood meta-analysis in which each study site was treated as a separate sample. The plot shows semi-partial correlations[54,55] between traditionalism and COVID-19 health precautions at each study site, after adjusting for the effects of the five identified suppressor variables in multiple linear regressions where health precautions were regressed on traditionalism and each of those five variables. Covariates were identical across study sites. Note that the semi-partial correlations indicate the variance in health precautions uniquely explained by the aspects of traditionalism separate from the five suppressor variables, and the effect sizes can be interpreted using the same metrics applied to product-moment correlations. See Figure 1 for a description of how to interpret the forest plot. For the overall meta-analyzed point estimate, neither the 95% confidence interval nor the 95% prediction interval overlap with zero.

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External-facing versus internal-facing precautions:

As discussed in the Methods section, exploratory factor analysis revealed that the

COVID-19 health precaution items can be decomposed into two factors, interpretable as

distinguishing between actions in which other actors are salient, and which are often publicly

visible (e.g., mask wearing and social distancing; hereafter *external-facing precautions*), versus

actions in which other actors are not salient, and which often occur in private (e.g., hand washing

and surface disinfection; hereafter *internal-facing precautions*). Because we did not predict this

factor structure in advance, and therefore did not have a priori predictions about how it would

affect the precautions-traditionalism relationship, the following analyses are exploratory.

To examine whether the relationship between traditionalism and COVID-19

precautionary behaviors varies as a function of whether precautions are external- or internal-

facing, we assessed whether subscale moderated the traditionalism-precautions relationship in a

mixed linear regression. We found that the strength of the traditionalism-precautions relationship

was greater for internal-facing precautions relative to external-facing precautions (see Figure 4).
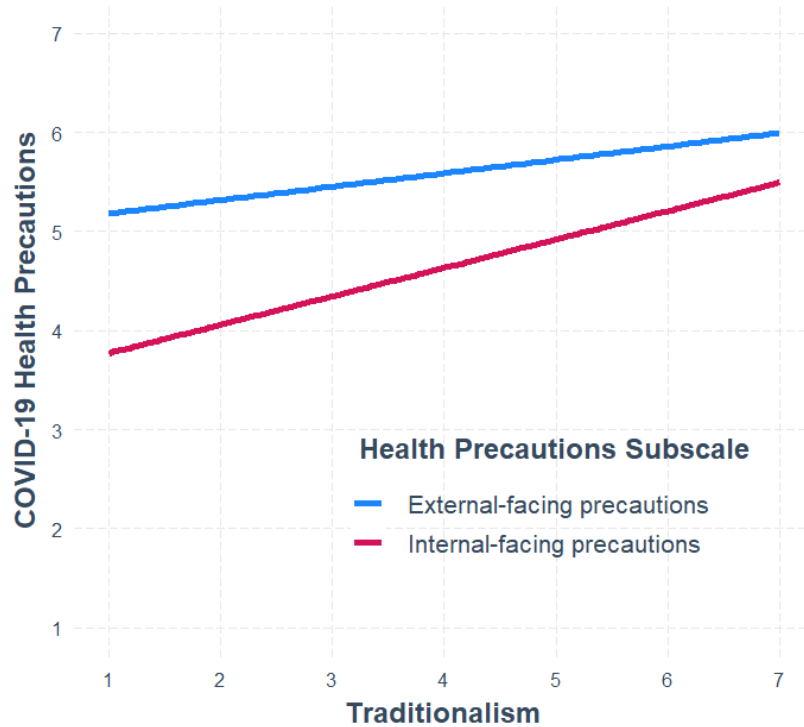
Figure 2.04 Effect of external- versus internal-facing precautions on the precautions-traditionalism relationship Results of a restricted maximum likelihood moderated mixed linear regression in which COVID-19 health precautions were regressed on traditionalism, a health precautions indicator variable (e.g., either internal-facing or external-facing), and the interaction between those two variables in the pooled sample. The model included participants nested within study sites as random effects. To test this interaction, there were two observations for each participant; the first observation contained each participants' internal-facing precautions score, and the second their external-facing precautions score. We simultaneously created an indicator variable specifying which health precautions subscale corresponded with each observation. Simple slopes were then plotted in the figure.

There was an interaction between health precautions subscale and traditionalism ($B = .16$, SE = .01, $t(7,535) = 12.76$, $p < .001$). A simple slopes analysis revealed that the correlation between traditionalism and internal-facing precautions ($B = .29$, SE = .01, $t(7,535) = 23.17$, $p < .001$) was about twice as strong as the correlation between traditionalism and external-facing precautions ($B = .14$, SE = .01, $t(7,535) = 10.84$, $p < .001$).

Note that these results were robust to the inclusion of demographic and COVID-19-related covariates, and they were not conceptually affected when the five suppressor variables were included as covariates (see Appendix 2). Further, results did not conceptually change when using factor scores instead of averaged composites (see Appendix 2). Finally, we considered the possibility that the presence—or lack of presence—of planning precautions may be confounding our interpretation of the external- and internal-facing precautions subscales. Specifically, the internal-facing subscale has more items related to planning precautionary behaviors (such as the importance of obtaining prophylactic supplies), whereas the external-facing subscale has more

items related to actual precautionary behavior (such as wearing a mask when outside the home). To address this possibility, we created a modified internal-facing precautions composite that excluded all planning-related precautions. Using the planning-less internal-precautions composite did not conceptually affect these results (see Appendix 2), suggesting that planning behaviors versus actual behaviors are not confounding our explanation for the moderating effect of external- versus internal-facing precautions.

Discussion

Consistent with a postulated link between traditionalism and motivations to mitigate dangers, across 27 nations, we found evidence that at the individual level, traditionalism associates positively with health precautions aimed at a global pathogen threat. In addition, in some socio-political contexts, perceived tradeoffs between health precautions and priorities concerning the economy, personal liberties, and the ability to practice traditions statistically suppressed the zero-order relationship between traditionalism and COVID-19 precautions, as did low trust in scientists and high social dominance orientation. Importantly, accounting for the effects of the suppressor variables resulted in a more consistent positive correlation between traditionalism and COVID-19 precautions. This suggests that when individuals' weightings of the costs, benefits, and tradeoffs of pathogen-threat mitigation and competing priorities—many of which are themselves tied to traditionalism—are taken into account, statistical associations between traditionalism and pathogen avoidance are more likely to be detected within any given cultural context.

These results both support the traditional norms account of the relationship between traditionalism and threat avoidance, and underscore the importance of parochial, countervailing preferences, many of which concern competing threat responses. Understanding the weights accorded to the costs and benefits of particular pathogen-avoidance behaviors in the real world is thus critical when assessing the extent to which traditionalism and pathogen avoidance covary

among individuals. As expected, we found considerable heterogeneity in effect sizes across study sites, further highlighting the importance of parochial factors, and the contribution of cultural variation in shaping traditionalism-pathogen avoidance relationships. Indeed, given the nested relationship between cultural evolution and the production of traditional norms, any evolutionary explanation for relationships between pathogen avoidance and traditionalism must take into account the possibility of substantial variation within cultures across contexts, and across cultures. For example, the extent to which traditions protect against pathogen threats may depend in part upon the content of those traditions, either via traditions' instrumental effects, or via the effects of adherence on ingroup cooperation and/or coordination.

Consistent with prior research on the tradeoffs attending COVID-19 prophylactic behaviors[29], we found that the relationships between traditionalism and COVID-19 precautions were stronger for internal-facing precautions (e.g., hand washing) than for external-facing precautions (e.g., mask wearing). This may owe to differences in the extent to which these two types of precautions are constrained by factors outside of personal control. Because external-facing precautions are more likely to be regulated by government rules—such as mask mandates—individuals may have less leeway to align their behavior with their preferences. Alternately, because they are more likely to conflict with the pursuit of a wide variety of benefits obtained through sociality, external-facing precautions may reflect valuation of the latter to a greater extent than internal-facing precautions. Indeed, external-facing precautions are probably more likely to clash with traditions, as precautions such as social distancing will often interfere with activities such as traditional religious practices. There are thus multiple plausible potential reasons why traditionalism covaries with external-facing precautions to a lesser extent than with internal-facing ones.

This study has multiple limitations. First, samples were recruited on the basis of convenience, and were not representative of their countries more broadly. In particular, given that participants needed access to computing devices and internet connectivity, and because some samples were comprised of students, socio-economic status and levels of formal education are not representative. Of equal importance, in addition to a lack of representativeness within study sites, the countries included were not globally representative. Countries from the Global North were overrepresented, while countries from Africa and South America were especially underrepresented. In both cases, our sampling procedures limit the generalizability of our findings. In particular, the relatively high frequency at which suppression was observed using a limited variable set derived from prior work conducted in the U.S. may reflect the over-representation of countries having shared cultural and political histories.

The effect sizes that we observed, though analogous in magnitude to those obtained in similar previous research[7,10], are relatively small. This likely owes in part to the fact that traditionalism is complex and multidetermined, and variation in it is not solely explained by pathogen-avoidance motivations. The same logic applies with regard to COVID-19 health precautions. Other sources of measurement error are also possible, such as the translatability and coherence of folk concepts and terminologies across societies and languages. In particular, our use of a broad but shallow assessment of traditionalism was likely one source of noise.

We measured the general proclivity to endorse one's society's traditions without examining the actual content of those traditions. This facilitated comparison across study sites irrespective of the particulars of any given society's traditions; point estimates indicate the relationships between traditionalism and precautions as construed at each particular study site. Nevertheless, by leaving the content of those traditions unspecified, this approach is unable to

explore the rich cultural particulars that may importantly drive variation across study sites. Such particulars likely vary markedly across social contexts and across cultures. Hence, we think it is inappropriate to closely compare the magnitudes of precise point estimates between the 27 study sites, or test causal explanations for heterogeneity in those estimates, especially given the issue of non-independence in country-level analyses[49]. Additionally, our samples were collected on a convenience basis, and none can be considered nationally representative. Although putative cultural dimensions such as tightness-looseness and collectivism-individualism might plausibly moderate the individual-level relationship between traditionalism and COVID-19 precautions,[36,50] for all of the aforementioned reasons, these data are not structured in such a way as to test nation-level hypotheses. Relatedly, it is beyond the purview of this project to unpack why effects may have obtained in specific study sites but not others, although we encourage future research that delves into particular social contexts more deeply, as well as possible culture-level moderators.

We examined only a relatively narrow set of possible suppressor variables, selected on the basis of their effects in previous research in the U.S. Our intention was to use these variables to probe whether, across diverse cultural contexts, cost-benefit tradeoffs and conflicting attitudes could influence traditionalism-pathogen avoidance relationships, rather than to exhaustively document all such possible tradeoffs. The latter would have been impractical in the present project given the large number of study sites and the diverse parochial factors germane to tradeoffs, and subjective weightings of those tradeoffs, entailed by COVID-19 precautions. Future studies, focused more narrowly on one or a small number of societies, should explore such tradeoffs in detail, including the extent to which politicization influences how individuals perceive cost-benefit structures.

Future work should elucidate the proximate mechanisms linking traditionalism and threat responsivity. Are traditionalists prone to perceive threats as relatively more attention-grabbing, and/or important, and/or susceptible to resolution through threat-mitigating action? Or, given the established links between traditionalism and respect for authority figures[1], might traditionalists simply be more adherent to the directives of relevant leaders in times of crisis? Relatedly, traditionalism may be linked with a propensity for collective coalitional action which facilitates threat-responsive behaviors in concert with others. The extent to which any or all of these complementary potential pathways contribute to the link between traditionalism and pathogen-avoidance is currently unknown. More broadly, whereas we have focused here on a real-world pathogen threat, might comparable dynamics obtain with regard to traditionalism and the propensity to take action in response to threats in other domains, such as intergroup conflict or resource scarcity?

We have approached the construct of traditionalism in an underspecified manner loosely isomorphic with a folk concept of "tradition" that recurs reliably across societies. Having found a cross-culturally replicable association, we encourage investigators to explore the particular facets of traditionalism driving the relationship with COVID-19 precautions. Are there specific in-group practices and/or beliefs of perceived antiquity (i.e., traditions) more closely associated with threat responsivity? If so, are these contingent on the nature of distinct threat domains? (E.g., are the components of traditionalism driving associations with pathogen avoidance distinct from components associated with threat responses to intergroup conflict?) Future work should examine which aspects encompassed by the superordinate construct of tradition are most strongly linked with pathogen-threat responsivity, as well responsivity to contrastive threats.

Such work may require focusing on fewer societies to allow more detailed consideration of the relative contributions of parochial beliefs and practices.

Ours is the first study to systematically investigate the relationship between traditionalism and avoidance of a specific infectious disease across a wide range of societies, attending to the kinds of costly, real-world behaviors that reflect the tradeoffs that shape actual decision making. Examining these phenomena at a global scale, we required methods that were coarse with regard to the particulars of the pandemic and its interactions with traditions in any one cultural setting. Despite this lack of granularity, consistent with the thesis that individual differences in the propensity to adhere to traditions are driven in part by differences in threat responsivity, we found evidence of a positive direct relationship between traditionalism and avoidance of a specific disease. When the individual and/or social contexts facilitated the alignment of traditionalism and health precautions, we observed that relationship at the zero order without needing to take other factors into account. When other preferences were perceived to clash with public health measures against COVID-19, stronger positive relationships between traditionalism and health precautions were detected in many cases after the effects of those clashing objectives were held constant.

Our findings have practical relevance for public health authorities and clinicians seeking to promulgate behavior changes that slow the spread of a disease that has claimed over six million victims worldwide. Whereas casual reflection might suggest that those who adhere to values and practices rooted in the past would be more hesitant to change behaviors or utilize new medical resources in the service of protecting themselves and others from a novel illness, in actuality, these may be the very people for whom, all else being equal, threats such as those posed by COVID-19 evoke mitigating action. The challenge may be that the same disposition to

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respond to this pathogen threat may also incline traditionalists to respond to other threats having conflicting mitigation requirements. It is thus crucial to recognize and address potential conflicts or tradeoffs that may inhibit tradition-minded individuals from adopting vital prophylactic and treatment practices beneficial to themselves, their societies, and the global community. More broadly, understanding the relationship between traditionalism and the extent to which danger prompts corrective action may prove vital as humanity confronts worldwide threats, from emerging pandemics to climate change, that can only be overcome through innovation and the adoption of new practices.

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CHAPTER 3

Accordance and Conflict Between

Religious and Scientific Precautions

Against COVID-19 in 27 Societies

Abstract

Meaning-making systems underlie perceptions of the efficacy of threat-mitigating behaviors. Religion and science both offer threat mitigation, yet these two meaning-making systems are often considered incompatible. Do such epistemological conflicts swamp the desire to employ diverse precautions against threats? Or do individuals – particularly individuals who are highly reactive to threats – hedge their bets by using multiple threat-mitigating practices despite their potential epistemological incompatibility? Complicating this question, perceptions of conflict between religion and science likely vary across cultures; likewise, pragmatic features of precautions prescribed by some religions make them incompatible with some scientifically-based precautions. The COVID-19 pandemic elicited diverse precautionary behaviors, and thus provided an opportunity to investigate these questions. Across 27 societies from five continents ($N = 7,844$), in the majority of countries, individuals' practice of religious precautions such as prayer correlates positively with their use of scientifically-based precautions. Prior work indicates that greater adherence to tradition likely reflects greater reactivity to threats. Unsurprisingly given associations between many traditions and religion, we find that valuing tradition is predictive of employing religious precautions. However, consonant with its association with threat reactivity, we also find that traditionalism predicts adherence to public

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health precautions – a pattern that underscores threat-avoidant individuals' apparent tolerance for epistemological conflict in pursuit of safety.

Introduction

Individuals vary in the frequency and extent to which they perceive threats in their environment. This threat sensitivity in turn motivates harm-mitigating behaviors. Many factors shape both a) the decision to engage in threat-mitigating behaviors broadly, and b) the choice of which precautionary behavior(s) to adopt. The concepts and beliefs with which the individual understands and makes sense of the world likely shape such decisions. Here, we explore how variation in threat sensitivity intersects with attitudes toward religion and toward science. Our goal is to illuminate the extent to which potential epistemological and pragmatic conflicts between religious and scientific meaning-making systems shape threat-mitigating responses in the context of a real-world pathogen threat.

Decisions to engage in threat-mitigating behaviors

Decisions to engage in threat-mitigating behaviors are shaped by many interacting endogenous and exogenous factors, including individuals' real and perceived vulnerability to different threats (e.g. Fessler et al., 2005; Sparks et al., 2018); informational and cultural environments that structure how various threats and threat responses are viewed (e.g. Gelfand et al., 2021); the goodness-of-fit between a particular threat response and an individual's preexisting epistemological schemas (Fessler & Machery, 2012; Lévi-Strauss, 1963); and assessments of the costs and benefits of various possible mitigations (e.g. Tybur et al., 2020). As illustrated by the consequences of widespread variation in how people have responded to recent global threats, it is vital to understand how threat-mitigating decisions relate to various aspects of

people's meaning-making systems, epistemological schemas, and considerations of cost-benefit tradeoffs.

Epistemic rationales for the efficacy of threat-mitigating behaviors

Threat-mitigating behaviors derive from a wide variety of epistemological frameworks and meaning-making perspectives. For example, many religious rituals are intended to supernaturally mitigate threats such as natural disasters (e.g. Duiveman, 2019). At the actual instrumental level, rituals may indeed mitigate threats by eliciting group cooperation and support (Sosis, 2004). Concordantly, religious ritual can also serve as an anxiety-reduction mechanism (Lang et al., 2020; Sosis & Handwerker, 2011) that facilitates effective responses to threats and other challenges (e.g. Pollack et al., 2018). In contrast, some threat-mitigating behaviors may derive perceived and/or instrumental efficacy from folk knowledge or folk intuitions about the natural world (e.g. Harrison et al., 2015; Miton et al., 2015). Folk conceptions of science are one such epistemological schema, structuring the rationale for many threat-mitigating behaviors in contemporary life. In addition to content biases, various context biases (Henrich & McElreath, 2003) such as prestige, conformity, and success biases, can underlie perceptions of the efficacy of threat-mitigating behaviors (e.g. de Barra et al., 2014). For example, precautions can be simply normative, in that their perceived justification derives from those behaviors being considered a culturally appropriate way to respond to a given circumstance, irrespective of whether any underlying causal mechanism is considered. Finally, some threat-mitigating behaviors—such as the fight or flight response—are developmentally canalized and autonomic, and do not necessarily have a cognized epistemic justification.

The above possibilities are not mutually exclusive. For example, religious precautions such as prayer or ritual can be both culturally normative and intended to invoke supernatural

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support. Additionally, for all the above, different precautions can have both "real" (i.e., mechanistically or instrumentally effective in the natural world) and perceived reasons for efficacy. Sometimes the two align, in that an individual's epistemological schema for a precaution matches its actual mechanism of action, and sometimes they do not, either because the actual mechanism of action differs from the perceived one, or because the precaution is perceived to be efficacious while having no actual instrumental effect.

Relationships between epistemically competing domains of threat-mitigating precautions

For any given threat or set of threats, more threat-sensitive individuals may embrace threat-mitigating behaviors broadly, even when those precautions derive their perceived efficacy from differing epistemological frameworks (e.g., an individual could both structurally reinforce their home and engage in religious rituals to ward off earthquakes). Given a stronger orientation toward threats, individuals may hedge their bets by maximizing the potential for harm reduction. Therefore, religiously- and scientifically-derived threat-mitigating behaviors may correlate.

However, the epistemic rationales for any two precautions can be perceived to clash. Many people view religion and science as incompatible (Funk, 2015; McPhetres & Zuckerman, 2018). As a result, given two potential precautionary behaviors in response to a threat—one deriving perceived efficacy from supernatural intervention, the other from scientifically-derived and/or endorsed mechanisms—individuals who see a religion-science conflict may view those precautions as mutually exclusive, or as having varying utility in actually mitigating that threat. Importantly, the relevant factor is whether a particular individual perceives an incompatibility between two threat responses and their epistemic entailments, not whether one objectively exists. Therefore, given the presence of an epistemic clash, do threat-mitigating behaviors still correlate? For example, when responding to a particular threat, rather than simultaneously

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entertaining epistemically competing precautions, people may mentally alternate between them. Alternatively, people may simply reject precautions that are inconsistent with their prior epistemological frameworks, such that threat-mitigating behaviors do not reliably correlate across epistemic domains.

Pragmatic conflicts between domains of threat-mitigating behaviors

In addition to epistemic conflict, threat-mitigating behaviors can directly trade off against each other. All precautions are inherently costly, even if only by virtue of opportunity costs. Indeed, if precautions were not costly, their frequency would likely vary far less across individuals. Instead, whether consciously or not, individuals must weigh the costs and benefits of any given precaution. Because more threat-sensitive individuals are likely to assign greater weight to such benefits, they are more likely to engage in threat-mitigating behaviors. Concordantly, given that threat-mitigating behavior entails costs, once individuals decide to address a threat, they must also determine which precautions to prioritize from among the range of possible options (e.g., should they reinforce their home against earthquakes first, or should they engage in an earthquake-prevention ritual first).

Oftentimes various possible precautions conflict only in terms of prioritization or the allocation of finite resources (e.g., given enough time and resources, it is possible to engage in both earthquake retrofitting and protective rituals). However, threat-mitigating behaviors can sometimes directly clash, such that one precaution pragmatically contravenes the ability to engage in a second. For example, staying and fighting a wildfire is mutually exclusive with evacuating. In sum, in considering the extent to which threat-mitigating behaviors correlate within individuals, it is necessary to consider both epistemic conflicts and direct clashes in the pragmatic ability to carry out competing precautions.

Understanding epistemic conflict between threat-mitigating domains in the context of COVID-19

The COVID-19 pandemic motivated individuals across the globe to address the threat of SARS-CoV-2 infection, with a wide array of epistemically competing precautions to choose from. Some of the most commonly performed precautions were those recommended by public health authorities, including mask-wearing, hand-washing, and social distancing (Lin et al., 2021). From a folk epistemological perspective, these were likely viewed as efficacious because they were rooted in the scientific process and were endorsed by sources of scientific authority. In contrast, other precautions—such as complementary and alternative remedies (Bendezu-Quispe et al., 2022)—derived from competing folk epistemologies. Religious precautions constituted another major domain of COVID-19 threat mitigation, including prayers, rituals, and collective worship (Bentzen, 2021; Isiko, 2020).

Given the common perception of a conflict between religion and science, religious precautions may have been perceived to epistemically conflict with public health precautions. For example, religious faith may make scientifically-derived precautions seem less efficacious than faith-based interventions, and vice versa. Further, the ability to engage in religious and public health precautions may have directly clashed, leading to zero-sum tradeoffs between those domains depending on the precautions in question. For example, social distancing directly contravenes the ability to attend collective worship services. Together, these dynamics may have important ramifications for understanding how people respond to emerging pathogen threats in particular, and socially impactful threats in general. Understanding whether people will simultaneously adopt multiple domains of threat mitigation may inform efforts to promote novel and efficacious precautions such as mask wearing.

Traditionalism, threat-mitigation, and competing epistemologies

In addition to interrelationships between various modes of precautionary responses, threat-mitigating behaviors likely associate with other individual preferences. These additional relationships further illuminate the cost-benefit tradeoffs of precautionary behaviors, and highlight the importance of decomposing threat-mitigation motivations into multiple domains with complex interactions. A large literature connects threat-avoidance motivations generally— and pathogen-avoidance motivations in particular—to individuals' preferences for traditional values and norms, such that those who strongly embrace tradition are more likely to engage in threat-mitigating behaviors (Claessens et al., 2020; Jost et al., 2009; Murray & Schaller, 2012; Samore et al., 2023; Tybur et al., 2016). The *traditional norms account* (Tybur et al., 2016) provides a functionalist explanation for this relationship, hypothesizing that traditional norms may have culturally evolved to consistently reduce the costs of certain recurrent threats. Several mutually compatible functional mechanisms could explain why adherence to traditions would have these threat-mitigating properties, in turn leading more threat-sensitive individuals to endorse traditionalism (see Samore et al. [2023] for discussion).

In the context of COVID-19, more traditionalist individuals may thus be more likely to adopt precautionary behaviors (Fischer et al., 2020; Samore et al., 2021). Indeed, using the same dataset as the present study, we previously found that, in a majority of the 27 societies sampled, traditionalism positively correlated with the reported frequency of adherence to COVID-19 public health precautions. However, we also found that traditionalism and public health precautions can clash when the two are perceived to trade off against each other. This is consistent with the above framework wherein engaging in precautionary behaviors depends in

part on the epistemic fit between a particular precaution and an individual's schemas and meaning-making perspectives.

The extent to which precautions and traditionalism co-occur should be sensitive to the perceived tradeoffs between traditions and particular domains of threat avoidance – tradeoffs that are individually and culturally contingent. Most prior work on the relationship between traditionalism and pathogen avoidance implicitly assumes that this relationship is invariant across different modes of precautions. However, some forms of pathogen avoidance may be perceived to epistemically conflict with tradition. For example, in the context of COVID-19, some public health precautions such as social-distancing were relatively novel behaviors in many societies, and thus could have been perceived as clashing with the tendency to conduct oneself in a traditional manner. In contrast, religious precautions against COVID-19 will likely have often been viewed as more compatible with traditionalism given that many religious practices are themselves perceived to be traditional. Other public health precautions, such as hand washing, were likely to have been normative prior to the pandemic, although those practices may not have been considered a core part of one's cultural tradition.

We aimed to test whether the relationships between threat sensitivity, traditionalism, and pathogen-avoidance behaviors were contingent on the particular mode of precaution in question. Having previously found a positive correlation between COVID-19 *public health* precautions and traditionalism (Samore et al., 2023), we next assessed potential associations between COVID-19 *religious* precautions and traditionalism. If traditional people tend to perceive less conflict with religious precautions than with public health precautions, then the overall relationship between traditionalism and pathogen avoidance ought to be stronger for the former. The present work can lead to a more nuanced understanding of the traditional norms account,

illuminating the extent to which traditionalism tracks pathogen-avoidance motivations. More broadly, we seek to contribute to the overall enterprise of understanding how epistemically diverse domains of threat-avoidance behaviors interrelate in real-world settings.

Increasing generalizability

Because the perceived extent of epistemic overlap or conflict between precautions will depend on the cultural context, it is important to study these dynamics in a cross-cultural sample to obtain a more generalizable understanding of how different real-world precautions associate. The extent to which religion and science are perceived to conflict varies across individuals and societies (Funk, 2015; Leicht et al., 2022), and will also depend in part on culturally-specific information environments that arose around the pandemic. When the perception of conflict is higher within a society, religious and public health precautions may be less likely to associate. Therefore, in addition to testing the overall association between potentially epistemically conflicting precautions, we sought to document the extent to which that association varies across cultures. Likewise, the relative strength of association between traditionalism and public health versus religious precautions will depend on the cultural context. For example, the extent to which religious practices are encoded as traditional, the extent to which public health precautions are construed as novel, and the extent to which those same public health precautions then clash with traditional practices will all vary across societies.

When examining the question of whether threat-avoidant individuals will or will not simultaneously pursue epistemically competing threat-mitigating behaviors, both possibilities are theoretically cogent. If people can set aside epistemic conflicts, more threat-avoidant individuals may hedge their bets by adopting many different modes of threat mitigation. Conversely, epistemic inconsistency may carry reputational costs within the group. Further, at the proximate

level, and given optimality constraints, resolving said conflicts may be cognitively or emotionally challenging, such that people will tend to exclusively pick one over the other. Further, if precautionary behaviors conflict pragmatically as well as epistemically, they are especially unlikely to co-occur.

Here, we consider the extent to which epistemically-diverse COVID-19 threat-mitigating behaviors correlate across a wide range of cultures, using participants' reports of their real-world precautions. We compare religious precautions, scientifically-justified public health precautions, and the extent to which these two precautionary modes conflict or accord. Further, we test whether the putative relationship between traditionalism and precautions is stronger for religious precautions relative to public health precautions, given the closer epistemic overlap between traditionalism and religion. We present the results of a study of 7,844 participants recruited across 27 countries during 2020 and 2021, examining the dynamics described above. Below, we articulate our specific research questions and hypotheses.

Research questions

1. Do religious and public health COVID-19 precautions correlate within countries?

At first glance, religious precautions and public health precautions in response to COVID-19 may seem incongruous—the former are often perceived as efficacious because of supernatural intervention (and might actually be effective by scaffolding threat-ameliorating cooperation between members of faith communities – see Sosis, 2004), while the latter are likely seen as having scientifically-derived instrumental efficacy. Nevertheless, the tendency to practice religious precautions may correlate with the tendency to embrace scientific precautions such as those recommended by public health authorities. If threat-mitigating behaviors are stimulated by

threat-avoidance motivations, individuals may pursue multiple avenues of precaution as a form of bet-hedging or threat-mitigation maximization (Hong, 2023), even when the epistemic rationales for those various precautionary domains conflict. The correlation between engaging in religious precautions and practicing public health precautions could thus be either negative or positive.

The cultural environment is likely to shape the perception of conflicts between religion and science, in part as a function of dynamics such as information environments (e.g., rhetoric from faith or scientific leaders, or from news media or political figures), the particularities of different faith traditions, and historical path dependencies. These same dynamics apply to the COVID-19 pandemic, where individuals' perceptions of the costs, benefits, and tradeoffs of various precautions varied widely (Samore et al., 2023), likely structuring cross-culturally variant perceptions of conflict or compatibility between religious and public health precautions. Hence, we expect cross-cultural variation in the extent to which engaging in religious and public health precautions correlate. We therefore tested the direction of, and estimated the strength of, the within-country correlation between religious and public health COVID-19 precautions, both in the entire sample, and, in order to explore cross-cultural variation, in each study-site subsample. Further, we sought to measure the existence of perceived epistemic conflict between religion and science by examining the relationship between religiosity and attitudes toward scientists. The present data derive from a larger project addressing many aspects of disease-avoidance psychology; because that project did not directly measure perceptions of conflicts between religion and science, here we use proxy measures, including religious belief and reported trust in science, to indirectly gauge epistemic conflict.

2. Do pragmatic tradeoffs moderate the relationship between religious and public health precautions?

While propensities toward different modes of threat avoidance may be related, that relationship should be sensitive to the particular tradeoffs and potential clashes between any two precautions. The relationship between religious and public health precautions may therefore be sensitive to zero-sum conflicts between competing behaviors. When religious and public health precautions do not directly conflict, more threat-avoidant individuals may hedge their bets and entertain both types of precautionary behaviors despite their divergent epistemic rationales. However, if precautions from one domain preclude engaging in precautions from the other, then individuals may be forced to prioritize between them, weakening the cross-domain correlation within individuals.

Some COVID-19 public health precautions were more likely to clash with religious precautions than others. For example, social distancing is directly at odds with engaging in prophylactic collective religious behaviors, such as group worship intended to mitigate COVID-19. In contrast, hand washing is unlikely to clash with collective worship, while social distancing does not prevent people from engaging in private prayer to ward off COVID-19. Therefore, greater pathogen-threat sensitivity may drive a general association between public health precautions and religious precautions as threat-motivated individuals seek out multiple modes of prophylaxis, yet that relationship can be expected to vary as a function of specific tradeoffs between certain classes of behaviors.

To test this possibility, we compared individual versus collective religious precautions (e.g., prayer vs. group worship), and internal-facing versus external-facing public health precautions (e.g., handwashing vs. social distancing). Ceteris paribus, internal-facing public

health precautions are less likely to conflict with either individual or collective religious precautions. While external-facing precautions are less likely to conflict with individual religious precautions, they are more likely to directly conflict with collective religious precautions, given that external-facing behaviors such as social distancing directly preclude engaging in behaviors such as group worship.

3. Does traditionalism associate more strongly with religious versus public health precautions?

In prior work using the same sample as the current study (Samore et al., 2023), we found that greater traditionalism tended to correlate with taking more public health precautions. This finding is consistent with the hypothesis that greater sensitivity to threats—including pathogen threats—is associated with greater traditionalism, given that practicing the tried-and-true may have threat-mitigating benefits. Because both public health precautions and religious precautions are domains of threat-mitigating behavior in response to the danger of COVID-19, the traditional norms account predicts that, all else equal, both ought to correlate with traditionalism. However, all else may not be equal regarding the epistemic fit between various precautions among traditionalists. For example, whereas traditions can clash with public health precautions in particular cultural contexts ((Samore et al., 2021, 2023), many religious precautions are themselves traditional, and hence inherently less likely to clash with traditionalism.

Per the predictions of the traditional norms account, we tested whether individuals' practice of religious precautions against COVID-19 (a manifestation of pathogen-threat sensitivity) correlated with their traditionalism across the 27 countries in the sample. Further, given that religious precautions may be less likely to conflict with traditionalism than relatively novel public health precautions, we assessed whether religious precautions correlated more strongly with traditionalism than did public health precautions.

Methods

Project overview

Research was approved by the UCLA Office of the Human Research Protection Program, and informed consent was obtained prior to participation. The questionnaire, translations, datasets, analysis code, and preregistrations of predictions and methods are available at https://osf.io/6vu5b/?view_only=873259d429c346d2912303fc44df5079. See Supplement for a list of questionnaire items and composite scales in English.

Between October 2020 and July 2021, adult participants ($N = 7,844$ after exclusions) were recruited across 27 countries for an observational, cross-sectional survey. Countries were included on a convenience basis, and the inclusion of possible study sites—as well as the representativeness of the samples recruited within them—was constrained by our use of online methods for recruitment and participation. Nevertheless, we aimed to include a wide range of societies across diverse major culture areas; see Figure S1 in Supplement. In countries where participants did not speak English, materials were translated by fluent bilingual speakers. The recruitment and compensation scheme varied across study sites, including unpaid volunteers, paid research participants, and student subject pools. See Table S1 in the Supplement for a summary of each study site, including site-specific Ns, survey language, recruitment procedures, and participant demographics. Data were prescreened for minimum completeness and correct answers to attention checks.

Measures

Measures were identical across study sites, with some small deviations where necessary (for example, response options for participant education differed across sites according to the

local education structure). A full list of these differences can be found on the OSF repository (see link above).

COVID-19 public health precautions

COVID-19 public health precautions were measured with a 13-item scale examining participants' self-reported real-world behaviors. Questions addressed behaviors which were generally associated with public health efforts to reduce COVID-19 infection risk during the initial stages of the pandemic, such as the frequency of mask wearing, hand washing, and social distancing. Items were rated on 7-point scales, either from "never" to "as often as possible", or from "not important at all" to "extremely important". An exploratory factor analysis (Samore et al., 2023) indicated that the 13 items could be coherently combined into a single public health precautions scale. Therefore, a composite public health precautions score was created by averaging across the 13 items (note that using factor scores instead of raw averages did not conceptually affect the results, see Supplement page S15). See Samore et al., 2023 for details on scale development and scale reliability. Consistent with prior research on COVID-19 precautions (Gul et al., 2021), this factor analysis also revealed two conceptually coherent subscales: *external-facing health precautions* (e.g., observing mask wearing and social distancing), and *internal-facing health precautions* (e.g., washing hands). Unless otherwise noted, the analyses presented in the main text report results using the combined composite.

COVID-19 religious precautions

Participants were asked two questions regarding religious behaviors aimed to protect against COVID-19: how frequently (7-point scale from "never" to "very frequently") they engaged in a) individual religious behavior (e.g., praying alone) to protect against COVID-19, and b) collective religious behavior (e.g., attending collective worship) to protect against

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COVID-19. Given that these two items were strongly correlated (r = .57), they were averaged into a single "COVID-19 religious precautions" composite for some analyses. Note that using the individual items instead of the composite did not conceptually affect the results.

Traditionalism

Because we could not identify a culturally-neutral traditionalism scale in the prior literature, we crafted our own measure by drawing upon two instruments that have been extensively used in cross-cultural research. These scales jointly assessed the concept of traditionalism, or the tendency to endorse and place importance on traditional norms. To increase comparability across study sites, we modified items so as to measure participants' broad propensity to embrace or disregard their own society's traditional social norms and values. The two scales were as follows. First, the conventionalism subscale of the Aggression-Submission-Conventionalism scale (Dunwoody & Funke, 2016), which includes items about traditionalism generally, such as, "Traditions are the foundation of a healthy society and should be respected." Second, the authority subscale from the Moral Foundations Questionnaire Short Version (Graham et al., 2011, 2008), which similarly assesses whether individuals respect traditions and authorities, both generally (e.g., "To what extent are the following considerations relevant to your thinking… Whether or not someone conformed to the traditions of society"), and in relation to specific values regarding gender and age roles (e.g., "Respect for authority is something all children need to learn"). Items were rated on 7-point scales, either from "Not at all relevant" to "Extremely relevant", or from "Strongly Disagree" to "Strongly Agree". Based on the results of an exploratory factor analysis conducted on all items 10 items jointly (Samore et al., 2023), six of the above items were averaged into an overall traditionalism composite (using factor scores instead of raw averages did not conceptually affect the results, see Supplement page S15). See

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Samore et al., 2023 for details on scale development and reliability. Note that, in order to avoid confounding, none of the traditionalism items explicitly concerned religiosity or religious practice.

Items testing perceptions of epistemic conflicts

First, participants were asked a single yes/no item as to whether they believed in a deity/deities or higher power(s). (For reasons of cultural sensitivity regarding privacy and/or social expectations, this item was excluded in Qatar and Austria.) Second, using a 7-point scale, participants were asked a single-item question concerning how much they trusted scientists regarding the COVID-19 pandemic.

Demographics, COVID-19-related covariates, and attention checks

Participants were asked about their gender identity and age, and their income relative to others in their country. Education was re-coded into a four-level structure so as to be comparable across study sites: primary school, secondary school, undergraduate-level, and postgraduate-level. We also measured a number of covariates relevant to the pandemic itself, including perceived COVID-19 prevalence in participants' local communities; the population density of those communities; whether participants' jobs required that they leave the home; and whether participants had certain pre-existing medical conditions that may put them at higher risk for severe disease. Summary statistics for the demographic and COVID-19 related covariates can be found in Tables S1 and S2 in the Supplement. Finally, we included several attention checks.

Results

Do religious and public health COVID-19 precautions correlate within countries?

First, we assessed whether participants perceived epistemic conflict between religion and science vis a vis the COVID-19 pandemic. Because this perception was not measured directly, we gauged the relevant attitudes obliquely using available questions. Consonant with the interpretation that participants perceived an epistemic conflict, those who believed in a deity, deities, or higher power(s) reported having less trust in scientists regarding the pandemic (see Supplement page S15).

We then assessed the main research question regarding the intra-individual correlation between religious and public health COVID-19 precautions. A random effects meta-analysis was conducted on the zero-order correlation between COVID-19 religious precautions and COVID-19 public health precautions, treating each study site as a separate sample (see Figure 1). The correlation between the two precaution domains was significant and positive at 21 of the 27 study sites. The overall meta-analyzed correlation was of small-to-medium effect size ($r = .19$, 95% CI [.15, .22]), with substantial variation across study sites ($I^2 = 56.77\%$, 95% prediction interval [.06, .32]). These results suggest that, on average, the self-reported frequency of practicing religious and public health precautions correlate together, even though the conceptual rationales for those precautions are derived from contrasting meaning systems. However, within bounds (the relationship never trended negatively at any study site), the extent to which religious precautions and public health precautions accord or conflict varied across study sites.

Study Site	Weight	Correlation [95% CI]
China	4.05%	0.03 [-0.08, 0.14]
Lithuania	3.35%	0.03 [-0.10, 0.17]
United States	3.57%	0.04 [-0.08, 0.17]
Indonesia	3.72%	0.10 [-0.03, 0.22]
Denmark	4.03%	0.10 [-0.01, 0.21]
Japan	3.55%	0.12 [-0.01, 0.25]
Slovakia	3.51%	0.15 [0.02, 0.28]
Austria	3.66%	0.15 [0.03, 0.27]
South Korea	3.01%	0.15 [0.00, 0.30]
France	3.10%	0.15 [0.01, 0.30]
Singapore	2.90%	0.15 [-0.00, 0.31]
Spain	4.36%	0.16 [0.06, 0.26]
U.K.	4.13%	0.16 [0.06, 0.27]
Canada	3.52%	0.16 [0.04, 0.29]
Poland	6.13%	0.18 [0.13, 0.23]
Guatemala	4.75%	0.19 [0.10, 0.28]
Chile	3.36%	0.21 [0.07, 0.34]
Mexico	2.92%	0.21 [0.05, 0.36]
Portugal	3.92%	0.23 [0.11, 0.34]
Turkey	4.41%	0.24 [0.14, 0.34]
Israel	3.96%	0.25 [0.13, 0.36]
Netherlands	4.16%	0.25 [0.14, 0.35]
Qatar	3.05%	0.31 [0.16, 0.45]
Italy	2.92%	0.31 [0.16, 0.47]
India	2.86%	0.37 [0.22, 0.53]
Philippines	4.00%	0.37 [0.26, 0.48]
Kenya	3.09%	0.38 [0.24, 0.53]
RE Model	100.00%	0.19 [0.15, 0.22]

Correlation Coefficient

Figure 3.01 Relationship between COVID-19 religious and public health precautions. Results of a random-effects, restricted maximum likelihood meta-analysis in which each study site was treated as a separate sample. Plot shows zero-order product-moment correlations between COVID-19 religious precautions and COVID-19 public health precautions at each study site, ordered by effect size. For the individual country estimates, the location of the square along the x-axis corresponds with the correlation coefficient, the size of the square corresponds with the weight of that study site in the meta-analysis, and bands are 95% confidence intervals. At the bottom of the plot, an overall meta-analyzed point estimate is provided. The midpoint of the diamond corresponds with that point estimate, the width of the diamond corresponds with the 95% CI, and the dotted bands correspond with the 95% prediction interval. On the right side of the plot, weights, correlation coefficients, and 95% CIs respectively are numerically listed for both the site-specific correlations, as well as the overall estimate. Note that for the overall meta-analyzed point estimate, neither the 95% confidence interval nor the 95% prediction interval overlap with zero.

Do pragmatic tradeoffs moderate the relationship between religious and public health precautions?

We then investigated whether the overall positive relationship between public health precautions and religious precautions was sensitive to possible conflicts between some

precautions in particular. Specifically, we examined whether the relationship between religious and public health precautions varied as a function of whether the religious precautions in question were individual versus collective, and whether the public health precautions were internal- or external-facing.

In order to test the relative associations of the two types of religious precautions on the one hand, and the two types of public health precautions on the other, we conducted two maximum likelihood linear mixed regressions in the overall sample, with random effects set for country. In the first model, internal-facing public health precautions were regressed simultaneously on individual and collective religious precautions. In the second model, external-facing public health precautions were simultaneously regressed on the same two religious precautions measures. The coefficients of the fixed effects for both models are plotted in Figure 2.

Consistent with our expectation that individual religious precautions were less likely to epistemically clash with public health precautions, the simple slope analysis indicates that individual religious precautions were positively related to both external- and internal-facing public health precautions. Meanwhile, the correlation between collective religious precautions and external-facing public health precautions was negative, consistent with the existence of pragmatic tradeoffs. However, contrary to expectations, collective religious precautions and internal-facing public-health precautions were uncorrelated.
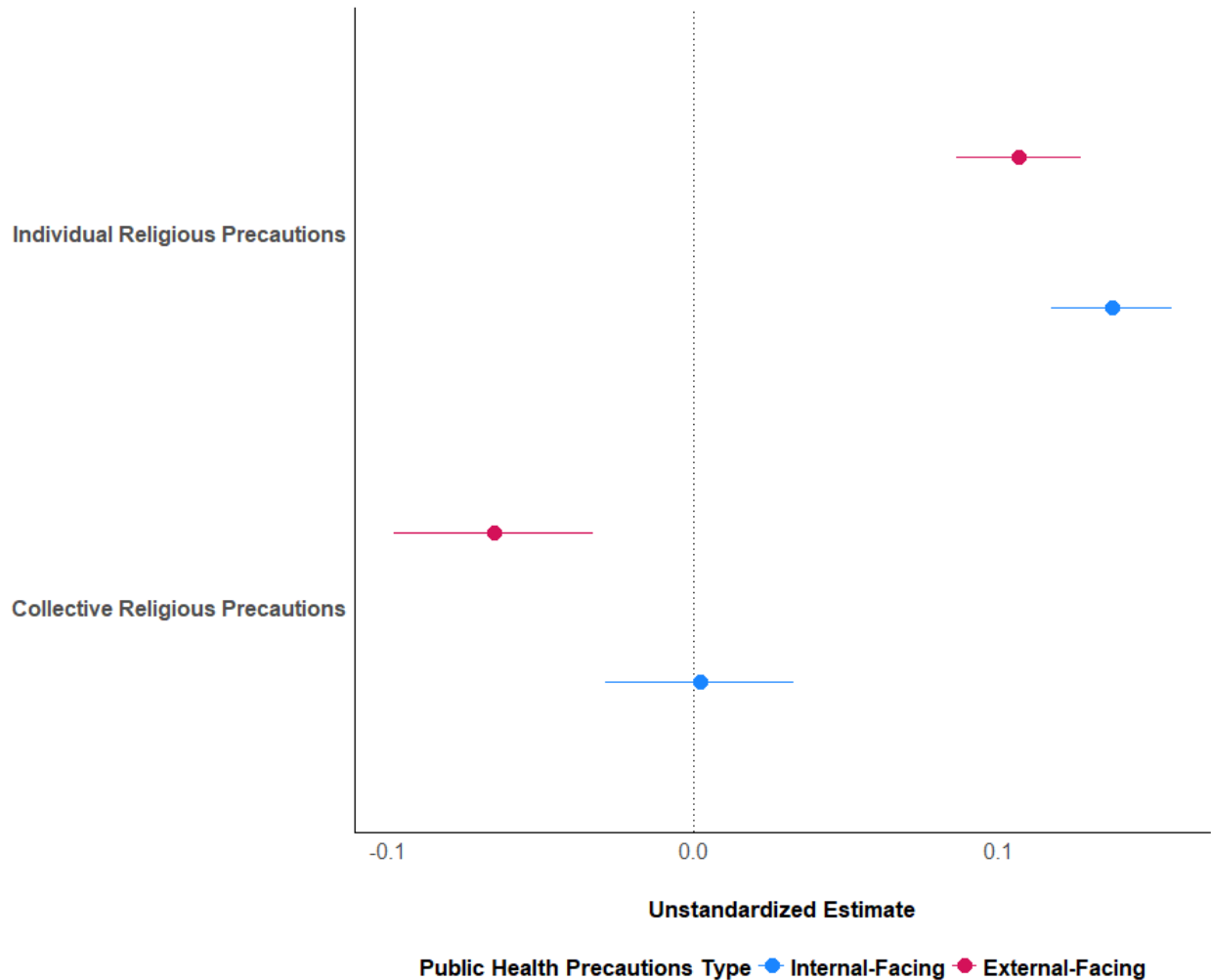
Figure 3.02 Effect of individual versus collective and internal- versus external-facing precautions on the relationship between religious and public health precautions. Results of two linear mixed models, simultaneously regressing internal- and external-facing public health precautions on individual and collective religious precautions respectively. Lines indicate 95% confidence intervals.

Does traditionalism associate more strongly with religious versus public health precautions?

We conducted a random effects meta-analysis on the zero-order correlation between traditionalism and COVID-19 religious precautions across all study sites (see Figure 3). At most study sites (21 of 27), there was a significant positive correlation between traditionalism and religious precautions, and the direction of the correlation was not negative at any study site. The overall meta-analyzed correlation—representing a weighted average of the country-specific

effects—was .24 (95% CI [.20, .29]), suggesting that, on average, there was a small-to-medium correlation between traditionalism and religious precautions across the countries included in this sample. Perhaps reflective of the fact that the extent to which traditional and religious values covary depends on the specific cultural context, the strength of the correlation varied substantially across study sites (I^2 = 76.79%, 95% prediction interval [.04, .45]). Separating out individual and collective religious precautions did not conceptually alter the results, see Supplement page S19.

Next, we compared the strength of the relation between traditionalism and public health precautions with the relation between traditionalism and religious precautions. We fit a restricted maximum likelihood linear mixed model to the pooled sample across all study sites, setting random effects for participants nested within countries. In order to compare traditionalism with the two modes of COVID-19 precautions, religious and public health precautions were collapsed into a single precautions composite. This precautions composite was then regressed on the interaction between traditionalism and a variable indicating whether the precautions in question were public health or religious. There was an interaction (see Figure 4) between precautions mode and traditionalism (B = .26, SE = .02, t(7538) = 14.45). Consistent with expectations, a simple slopes analysis revealed that the relation between traditionalism and religious precautions (B = .51, SE = .01, t(7,535) = 37.12) was about twice as strong as the relation between traditionalism and public health precautions (B = .25, SE = .01, t(7,535) = 18.52). However, even when added to the same model, both modes of COVID-19 precaution remained correlates of traditionalism, suggesting that greater traditionalism is consistent with multi-modal responses to pathogen threats.

Study Site		Correlation [95% CI]
Denmark		3.90% 0.08 [-0.03, 0.19]
South Korea		2.86% 0.08 [-0.09, 0.26]
China		3.93% 0.08 [-0.02, 0.19]
Austria		3.67% 0.11 [-0.02, 0.23]
Mexico		3.13% 0.11 [-0.05, 0.27]
Kenya		2.99% 0.14 [-0.02, 0.31]
Israel		3.79% 0.15 [0.03, 0.27]
Singapore		3.20% 0.16 [0.00, 0.31]
Japan		3.56% 0.16 [0.03, 0.29]
Canada		3.62% 0.18 [0.05, 0.30]
Lithuania		3.57% 0.18 [0.05, 0.31]
Netherlands		3.93% 0.19 [0.08, 0.30]
Spain		4.10% 0.19 [0.09, 0.29]
U.K.		3.99% 0.21 [0.11, 0.32]
France		3.39% 0.21 [0.07, 0.35]
United States		3.75% 0.24 [0.12, 0.36]
Qatar		3.20% 0.24 [0.09, 0.39]
India		3.03% 0.30 [0.14, 0.47]
Indonesia		3.91% 0.31 [0.20, 0.42]
Portugal		3.95% 0.33 [0.22, 0.43]
Slovakia		3.79% 0.33 [0.21, 0.44]
Guatemala		4.40% 0.35 [0.27, 0.43]
Chile		3.69% 0.35 [0.23, 0.47]
Turkey		4.28% 0.40 [0.31, 0.49]
Poland		4.89% 0.40 [0.35, 0.44]
Italy		3.40% 0.41 [0.27, 0.55]
Philippines		4.10% 0.48 [0.39, 0.58]
RE Model		100.00% 0.24 [0.20, 0.29]

Correlation Coefficient

Figure 3.03 Correlation between COVID-19 religious precautions and traditionalism. Results of a random-effects, restricted maximum likelihood meta-analysis in which each study site was treated as a separate sample. Plot shows the zero-order product-moment correlations between traditionalism and COVID-19 religious precautions at each study site, ordered by effect size. See Figure 1 for a description of how to interpret the forest plot. For the overall meta-analyzed point estimate, neither the 95% confidence interval nor the 95% prediction interval overlap with zero.

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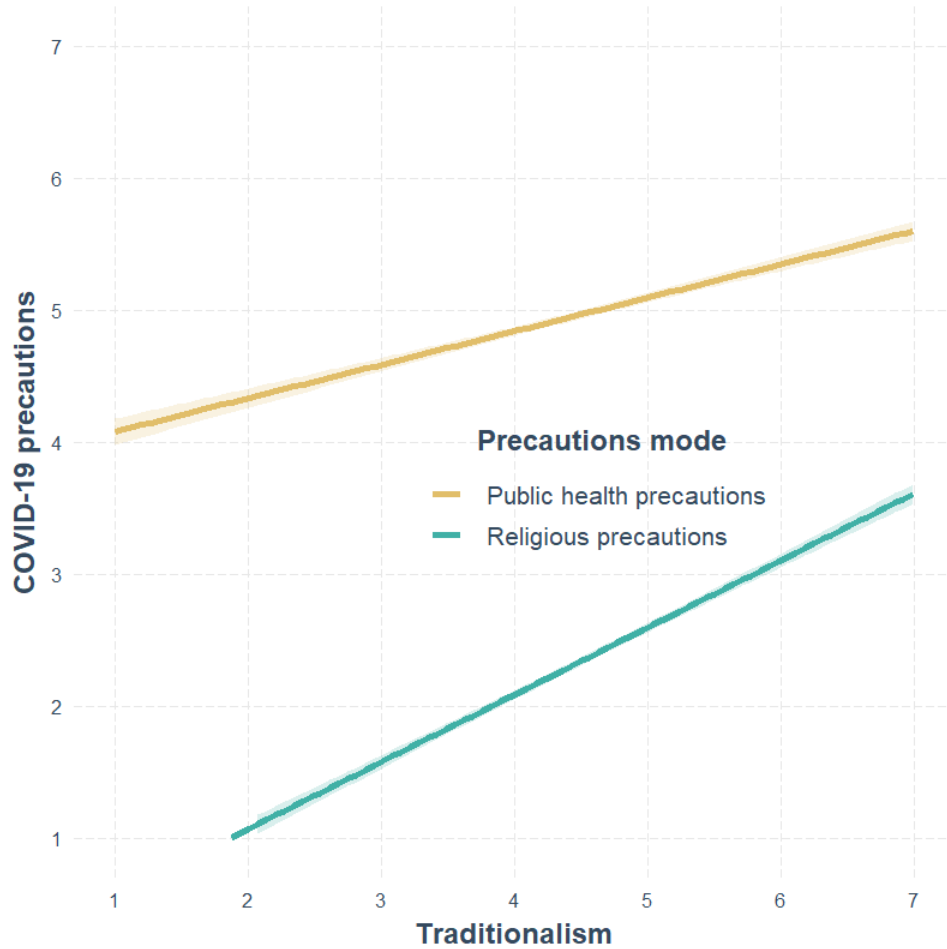
Figure 3.04 Comparing the relationships between traditionalism and religious versus public health COVID-19 precautions. Interaction plot based on the results of a moderated mixed linear regression in the overall pooled sample across all study sites. COVID-19 precautions were regressed on the interaction between traditionalism and a variable indicating whether the precautions were religious or public health in nature.

Accounting for covariates

The results reported above were robust to the inclusion of demographic controls—

including age and education—as well as COVID-19-related covariates, such as participants'

estimates of COVID-19 prevalence (see Supplement page S22).

Discussion

Our overall results suggest that in some contexts, individuals do not strongly police epistemic boundaries when responding to threats. Across the 27 countries included in the sample, the extent to which individuals reported taking religious precautions against COVID-19 tended to correlate with their reported adherence to science-based public health precautions. Therefore, despite possible epistemic conflict between the competing rationales for religious and public health precautions, individuals who practiced one type of threat mitigation were nevertheless more likely to also practice the other type. These results are consistent with the possibility that on average, threat-sensitive individuals tend toward entertaining multiple possible epistemologies in the service of threat mitigation. However, there was also widespread cross-cultural variation in the relationship between religious precautions and public health precautions, ranging from null relationships to medium-sized positive correlations. This finding suggests that aspects of the social environment influence the extent to which epistemic conflict is perceived and/or acted on between different domains of threat mitigation.

In addition to the moderating effects of the social environment, we also predicted that pragmatic clashes between particular religious and public health precautions would mute the overall correlation in certain cases. Specifically, while precautions can be perceived to trade off because of competing epistemic rationales, they can also trade off because of pragmatic mutual exclusivity. Therefore, we compared individual versus collective religious precautions, and internal- versus external-facing public health precautions, predicting that external-facing public health precautions would directly clash with collective religious precautions in a zero-sum manner. Consistent with expectations, external-facing and collective precautions were negatively correlated, albeit only weakly. However, on the whole, these predictions were only partially

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supported, as collective religious precautions also clashed with internal-facing public health precautions despite the lack of obvious pragmatic tradeoffs between them.

One possible explanation of the above is that participants may not conceptually discriminate between internal- and external-facing precautions in their mental models of public health behaviors, despite the fact that the relative frequencies of these two categories can be decomposed. In other words, given a shared epistemic rationale rooted in science, precautions such as social distancing and hand washing may tend to be lumped together when people weigh cost-benefit tradeoffs. If conceptual distinctions are not being made between internal- and external-facing precautions, participants who prioritize collective religious behavior may perceive conflict with public health precautions generally. Another possibility, compatible with the above, is that particular political attitudes and associated information environments tend to covary with religious praxis in some socio-political contexts. Given the role of political polarization in shaping precautionary COVID-19 behaviors (e.g. Samore et al., 2021), these covarying political beliefs may have elicited negative attitudes toward public health precautions writ large among religionists who prioritized collective religious behavior. Likewise, government rulemaking around public gatherings such as religious worship may have contributed to the clashes between collective religious precautions and government-supported public health precautions. However, these explanations are post hoc and speculative, and cannot be tested with the available data.

Finally, our results further support the traditional norms account, while also highlighting the importance of contextually contingent tradeoffs in structuring the relationship between traditionalism and threat avoidance. Specifically, we found that the reported frequency of religious precautions positively correlated with traditionalism at most study sites, which is

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unsurprising given the close overlap between tradition and religion in many cultural contexts. Further, the relationship between religious precautions and traditionalism was stronger than the relationship between public health precautions and traditionalism, perhaps reflective of the role of epistemic priors and cost-benefit assessments in structuring how traditionalists respond to threats. By breaking down threat avoidance behaviors into distinct domains, our research adds nuance to the prior literature on traditional attitudes and threat responses.

This study was limited in important ways. First, our sampling procedures limit the generalizability of the findings. Participants were recruited on the basis of convenience, and thus samples were not representative of their respective countries, particularly in terms of socio-economic status and formal education. For example, participants could only access the study via the internet, and, at some study sites, samples were comprised of students recruited from university subject pools. Our results should therefore not be taken to represent the cultural characteristics of an entire country. Although country is conveniently used to index the general location of each study site, the study sites are in actuality comprised of a non-representative population within each respective country. Equally importantly, the countries and cultures included in the study were not globally representative. In particular, countries from the Global North were oversampled, while countries from Africa and South America were particularly underrepresented. We thus sampled a limited and biased range of human societies, and our results likely do not capture the full range of possible variation concerning the relationships being tested (Henrich et al., 2010).

Second, although it is tempting to explain post hoc patterns of variation across the study sites by testing nation-level predictors in a meta-regression, this research was not structured to test causal explanations for heterogeneity in effects across study sites. In particular, the lack of

representativeness within and across study sites precludes such attempts. Similarly, this project does not aim to explain why certain effects were observed in some study sites but not others. Our data lack the kind of ethnographic and culturally particular richness required to explain site-specific phenomena. Instead, we focused on overall trends across study sites.

Third, additional unmeasured individual differences may moderate the relationship between religious precautions and public health precautions. For example, although greater perceptions of conflict would likely suppress the correlation between religious and public health precautions, we did not measure explicit beliefs about epistemic conflict between religion and science. Although we attempted to indirectly measure said conflict by examining differences in trust in scientists and reported public health precautions across believers and non-believers, future research should explicitly model how people's perceptions of the religion-science conflict structure their subsequent behavioral strategies vis-a-vis threat mitigation in contexts such as the COVID-19 pandemic.

In contrast to much of the prior literature on threat sensitivity and pathogen avoidance, we asked participants about contemporaneous and inherently costly behaviors in response to a highly impactful and globally salient real-world threat. This research contributes to an understanding of how religious and scientific epistemologies interact, conflict, and harmonize in an actual behavioral domain. Rather than a simplistic religion-versus-science dichotomy, our results suggest that individuals make complex decisions about religiously and scientifically justified precautions. On the one hand, the correlation between precautions across disparate domains is broadly consistent with overarching individual tendencies toward threat avoidance, or even negativity bias writ large (Hibbing et al., 2014). However, these results also point to the contextual importance of specific cost-benefit tradeoffs, epistemic perspectives, and cultural

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variation, indicating that threat sensitivity and avoidance are not monolithic dimensions of individual difference. Given societies' vital interest in convincing individuals from diverse perspectives to adopt novel precautionary behaviors in response to shared threats, it is important to understand the conditions under which individuals are willing to adopt new and/or epistemically conflicting precautions, particularly when such behaviors may conflict with deeply held religious beliefs and practices.

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CHAPTER 4

Steps Toward an Interdisciplinary

Anthropology of Mind:

Intersections Between Evolutionary and

Psychological Anthropologies[3]

Introduction

In the U.S., anthropology departments are often partitioned along disciplinary lines, with marked divisions being common between evolutionary and psychological anthropologies. This is unfortunate, as key insights and developments—both theoretical and methodological—ought to be shared across subdisciplines. Given that many evolutionary anthropologists have in common with their colleagues in psychological anthropology an interest in the relationship between mind and culture, there is opportunity for greater dialogue between these subfields. Being evolutionary anthropologists ourselves, we are primarily able to speak to the question of what evolutionary approaches can offer psychological anthropology, rather than the reverse. The somewhat unidirectional flavor of this chapter thus reflects the parochial nature of our own expertise, as well as the likely audience of this Handbook, rather than any undervaluation of bidirectional exchange. Indeed, we believe that evolutionary anthropology—and the evolutionary social sciences more broadly—would benefit enormously from incorporating many of the important

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[3] Note that this chapter has been accepted for inclusion in *The Cambridge Handbook of Psychological Anthropology, Edward D. Lowe, Editor*.

contributions developed in psychological anthropology. We look forward to those future conversations.

Before describing some of the insights an evolutionary outlook has to offer psychological anthropology, we must first locate our viewpoint within the broader evolutionary social sciences. We subscribe to an evolutionary perspective that places emphasis on a) humans as a culture-dependent species, possessing a suite of biologically-evolved adaptations for both acquiring culture and enacting encultured lives (Fessler, 2006; Richerson & Boyd, 2008); b) the significance of variation within and across cultures and contexts (Apicella & H.C. Barrett, 2016; Kline et al., 2018); c) the importance of ontogeny, and the role of culture in shaping the environments and contexts to which those developmental processes respond, as well as the impact of historical processes and institutions on human behavior and its evolution (Barrett 2015; Fuentes 2017); and d) avoiding reducing all human behavior to a framework focused solely on individual biological fitness.

We acknowledge the accuracy of many of the criticisms of the evolutionary social sciences—particularly of evolutionary psychology—leveled by other anthropologists. As anthropologists practicing an evolutionary approach to human psychology, our perspectives are a minority view within evolutionary psychology as a whole, and we are painfully aware of the ethnocentric and culture-bound views of some in the field. Communicating a broader, more culturally inclusive perspective throughout the evolutionary social sciences is an important ongoing enterprise (see H.C. Barrett, 2021; Broesch et al., 2020; Clancy & Davis, 2019).

As in psychological anthropology, with its wide array of perspectives on the human mind, the evolutionary social sciences are comprised of a set of topics rather than a uniform set of theories. We thus do not claim to represent the entirety of the evolutionary social sciences; it

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is a heterogenous field (Laland *et al.* 2011), and approaches vary on the role of culture and social construction in shaping human behavior, psychological diversity, and the existence of human universals. We fall on the end of the disciplinary spectrum that gives substantial weight to the role of, and feedback dynamics between, culture and institutions, developmental processes, and individual agency in shaping the mind. In contrast, we are not as closely related to the version(s) of the evolutionary social sciences associated with canonical evolutionary psychology, as these approaches are at times ethnocentric; often overly focused on identifying human universals; and insufficiently engaged with culture and human diversity. At the worst end (from both scientific and moral perspectives) of the spectrum, such approaches can be outright biologically determinist – even eugenicist – in outlook.

Returning to the central question of points of contact between the evolutionary social sciences and psychological anthropology, a wholistic anthropological approach ought to address the human mind through multiple avenues, across multiple axes of differentiation. Behavior can be studied across a wide range of nesting scales, from large-scale group dynamics to richly particular person-centered perspectives. As the scale of analysis changes, so does the generalizability or specificity of the explanations accompanying it. However, rather than taking a hierarchical perspective on the relative merits of these modes of knowledge production, we see them as complementary. Likewise, we can contrast temporal levels of analysis, from phylogenetic to historical to contemporary timeframes, each of which speaks to important aspects of human psychology across time and geographical space. While recognizing that evolutionary approaches are not always appropriate for every level or every mode of analysis, we nonetheless believe they can provide a useful means of making connections between levels. For example, evolutionary approaches connect population-level phenomena and individual-level

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behaviors by providing a unified theory of causal mechanisms linking those different levels. At still more granular scales, an evolutionary approach decomposes psychological features into constituent explanations (Scott-Phillips et al., 2011), from ultimate evolutionary function or adaptive significance at either the biological or cultural level (or, at the very least, determining if there is one) to proximate mechanisms by which those traits are effected, as well as the ontogenetic processes that both shape those traits across development, and lead to substantial diversity across individuals, contexts, and groups. Importantly, consonant with their roots in the fields of evolutionary biology and experimental psychology, theories in the evolutionary social sciences are structured so as to be disconfirmable, and are subjected to hypothesis testing. The resulting models of mind and culture therefore often stand on quite firm empirical foundations.

An exhaustive overview of evolutionary approaches to human psychology in an anthropological context would exceed the bounds of a single book chapter, hence we do not attempt it here. Rather, in what follows, by focusing on a small number of examples, we hope to illustrate the utility of a closer relationship between psychological anthropology and the evolutionary social sciences.

Given the two fields' shared interest in understanding the effects of cultural variation on human minds, we begin with an overview of the human capacity for culture. Using this as a theoretical foundation, we then discuss emotions in light of both culture and evolved psychology. Commensurate with the longstanding importance of emotions in evolutionary and psychological anthropologies, we think this topic holds considerable potential for intellectual exchange between the fields. We explore how evolutionary perspectives on emotion articulate with debates about universalist versus cultural constructivist positions. Specifically, because an evolutionary perspective entails attending to the design features that constitute emotions, it addresses in a

systematic fashion what aspects of emotion are uniform across cultures, what varies, and why such variation occurs. In turn, attending to those design features can generate novel predictions and insights in both quantitative and qualitative research.

Cultural information and individual minds

Before focusing on the study of emotion, it is useful to briefly outline an evolutionary perspective on culture and cultural variation, providing a foundation for understanding cultural universality and variation in emotion through the lens of functional design. Drawing on much prior work, we define *culture* as socially transmitted information that is shared by some or all of the members of the group, where that information can manifest in direct communication, behavior, practices, artifacts, or institutions. Both cultural and non-cultural information is held in the *mind*, which we define as the complete set of an individual's internal mechanisms that acquire, process, and retain information, including mechanisms that motivate behavior, as well as those constellations of processing and motivating mechanisms that, being relatively consistent in their output over time, constitute what is typically thought of as *personality*.

The ability to acquire and transmit information between individuals has been progressively fitness-enhancing over the course of hominin evolution, creating a positive feedback process linking ever-increasingly valuable cultural information with greater and greater psychological capacities for culture. Through non-genetic evolutionary processes (Claidière *et al.* 2014), cultures change over time, constituted by norms and practices that can confer benefits in local social and ecological environments, and promote cooperation and coordination among ingroup members (Boyd et al., 2011; Richerson et al., 2016). For example, cultural evolution can favor food preparation practices that neutralize toxins in local food sources (Langlie 2021);

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useful technologies (Richerson & Boyd, 2008); locally relevant ecological knowledge; and norms that signal group membership in the context of cooperation and conflict (McElreath et al., 2003).

Within such a snowballing information environment, natural selection acting on individuals correspondingly favored cognitive and emotional attributes that enabled them to maximally take advantage of available cultural information (Fessler, 2006a). Critically, humans inherit not just genes, but also cultural information, developmental niches, and epigenomes. What are termed *dual-inheritance theories* have been highly successful in explaining many superordinate phenomena regarding human evolution (see Mesoudi, 2016). This includes understanding why the capacity for social learning and cultural transmission evolved in the first place; why humans are generally highly cooperative; modes of cultural transmission; recurrent design features in cultural systems; and the co-evolutionary dynamics between cultural and biological evolution.

Yet, this is also an incomplete portrait. While dual-inheritance theories and their largely top-down evolutionary perspective on fitness and evolution play a significant role in explaining human psychology, they are also highly abstracted relative to the kind of in-depth, context-specific research conducted in psychological anthropology—investigations that are vital for understanding humans and human variation. Cultural processes are more complex than their fitness outcomes at the individual and group levels. The human capacities for cultural and developmental flexibility are themselves, via virtuous cycles, agents of evolutionary change and niche construction, creating unique histories, institutions, memories, and socio-relational constructions that do not exist only as products of evolutionary selective forces (Fuentes 2016). This in turn contributes to the profound individual and cultural variation observed across

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humankind. A complete evolutionary theory, including one that can explain variation in emotions across societies, needs to bridge between these different levels more fully. We offer several possibilities using a cultural evolutionary lens.

First, culture does not solely exert a top-down influence on individuals within a social milieu. Instead, people are part of a generative process that contributes to cultural systems. Concordantly, *cultural attraction theory* argues that cultural information is reconstructed and transformed within the minds of every individual who possess that information (Scott-Phillips et al., 2018). As a result, culture does not sit externally outside mind, but is instead collectively instantiated by individuals who have partially overlapping, partially varying conceptualizations of cultural information. Critically, the features of an individual mind determine how a given piece of socially transmitted information is received and processed, including whether it is accepted, retained or transformed, and transmitted to others. In any informational environment, there is variation in the fit between ideas and features of minds, such that, as Lévi-Strauss (1963:89) put it, some ideas are "good to think", and other ideas less so. When that fit is high, and is consistent across individuals, an idea will both spread more rapidly in a population and persist more extensively relative to other ideas. Features of minds that cause the success of some ideas relative to others are termed *cultural attractors*. Both universal features of human psychology and parochial configurations produced by culturally patterned socialization and enculturation can constitute cultural attractors—indeed, cultural attraction can result in mutually reinforcing cycles whereby particular features of a social environment in turn generate new basins of cultural attraction. In the context of features of the mind such as emotions, these path-dependent processes may lead to culturally unique phenomenological constellations that are nevertheless arrived at via cultural evolutionary forces interacting with individual minds.

Cultural attraction theory thus provides a formal basis for understanding the success or failure of information in a marketplace of ideas held by individual minds.

As our earlier reference to Lévi-Strauss suggests, cultural attraction theory parallels in some respects, and diverges from in others, bottom-up concepts developed in psychological anthropology regarding the ways in which individual minds instantiate, create, modify, and transmit the contents of culture. Theodore Schwartz (1978) conceptualized the *idioverse* as the individual's portion of culture – or, more formally, the sum set of cultural constructs that exist within an individual. As in cultural attraction theory, idioverse theory recognizes the transformations made on shared cultural packets by individual minds. However, in contrast to theories of cultural evolution, Schwartz views these packets as constituting, rather than interacting with, personality itself. Adopting a more explicitly informational approach, cognitive anthropologists such as Roy D'Andrade (e.g., 1995) have focused on *schemas*, cultural packets conceptualized as transmittable cognitive programs that are executed by individual minds (see Bennardo and de Munck, this volume). From a cultural evolutionary perspective, such execution is in part a function of the goodness-of-fit between a given cultural schema and the mind, both in terms of the human mind's largely invariant information-processing capacities and characteristics, and in terms of the congruence between a given schema and the individual's repertoire of previously acquired schemas.

Psychological anthropologists such as Schwartz and D'Andrade implicitly presume both a panhuman evolved psychology and an iterated process whereby, through interactions with minds, the information prevalent in a population evolves. However, because such theories specify neither the detailed architecture of the mind nor the competitive dynamics that characterize the marketplace of ideas, they are largely unable to explain both how cultural

constellations that are functional in a given social and physical ecology arise, and why cultural universals exist. In contrast, by formalizing why some ideas are "good to think", cultural attraction theory can in part explain how personal experiences, relational models, ways of knowing, etc. shape cultural evolution given the transformation being applied by individual minds. Further, it provides a systematic framework for predicting when cultural concepts are more likely to be relatively uniform across individuals either within or across societies. Within-society uniformities owe to the goodness of fit of a given idea (and thus its competitive advantage relative to alternative ideas) with regard to both broadly shared cultural schemas and similarities in developmental experience deriving from cultural factors, the result being a more-or-less integrated ethos (compare with Spiro, 1997). At the same time, uniformities across societies owe in part to the goodness of fit with panhuman features of our species' biologically-evolved psychology. Along the latter lines, cultural attraction theory illuminates why certain cultural concepts repeatedly arise. For example, the ubiquitous features of rituals across cultures (Boyer & Liénard 2006; Fessler 2006a), the centrality of meat in food taboos (Fessler & Navarrete, 2003), the predominance of information regarding hazards in stories and supernatural beliefs (Fessler et al., 2014), and core structural features of supernatural beliefs themselves (Boyer 2001) are all potentially partially explicable using this framework. Such topics converge with those commonly studied in psychological anthropology, presenting an opportunity for greater contact and cross-pollination.

Turning now specifically to the topic of emotions, evolutionary perspectives on culture can provide a systematic framework for understanding the interaction between emotions and culture, and how that relationship can vary across contexts. For example, information is more likely to be culturally transmitted when it is emotionally salient, for instance if it elicits disgust

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(Eriksson & Coultas 2014; Heath *et al.* 2001). Further, coupled with an adaptationist view on the function of emotions, understanding the constraints on cultural evolution illuminates why certain features and constellations of emotions reliably emerge across cultures. Below, leveraging the foundation provided by evolutionary approaches, we explore how an evolutionary perspective can productively contribute to a psychological anthropology of emotion. Because emotion is itself too broad a category for a single chapter, we will focus on anger and disgust as particularly illuminative in this regard.

A middle-ground perspective on the universality and cultural construction of emotions

In the past, evolutionary or biological perspectives on emotion have often been construed as inherently in opposition to cultural and social constructivist models (e.g. Averill, 1980; Prinz, 2004), such that emotions are viewed either as universal and invariant across cultures, or as culturally constructed and incommensurate across cultural contexts (Barrett 2006; Lindquist 2013). This is a false dichotomy. Cultural variation in emotions—as well as their important social relational and communicative components—is highly compatible with an evolutionary approach that identifies both a) specific biologically evolved adaptive functions, and b) recurrent ranges of developmental outcomes in response to particular environments (H. C. Barrett, 2015; Fessler, 2006a). Further, as noted above, the human mind centrally includes mechanisms that evolved biologically for the purpose of acquiring cultural information—including its effect on how we experience and make sense of ourselves, our motivational systems, and our emotions. Cultural variation and adaptive function are compatible and interdependent in their shaping of human emotions. Indeed, cultural evolutionary and extended evolutionary synthesis models anticipate both variation in emotions across cultures, and important social relational components

that can be quite divorced from any recurrent adaptive challenge characteristic of the deep evolutionary past. By recognizing that felt emotions are the product of the intersection of a panhuman biologically-evolved affective architecture and the meaning-making contextual and self-reflective schemas internalized via the culture-acquisition machinery (D'Andrade, 1995; Fessler, 2007), an evolutionary approach provides a formal basis for the important insights of psychological anthropologists who first theorized the intertwining of cultural and biological dynamics in shaping emotions (e.g. Levy, 1984; Lindholm, 2005).

In regard to perspectives on emotion within the evolutionary social sciences, we acknowledge that there is a failure to reckon with the profound effect of culture on emotions in a great deal of contemporary evolutionary social science research, as well as quasi-evolutionary conventional psychology (as exemplified by work in the tradition of Ekman and Friesen [1971]). Further, evolutionary social scientists frequently make the mistake of confusing parochial lexical emotion terms with the actual psychological entity (Fiske 2020). At the same time, we hold that the extreme cultural constructivist tenet that emotions are unbounded and incommensurate across cultural and individual contexts is untenable given voluminous evidence supporting the core principle of an evolutionary approach to psychology, namely, that i) the species-typical architecture of the mind consists of a complex compilation of mechanisms, many of which evolved to address particular categories of adaptive challenges (Tooby & Cosmides 2008), where ii) evolved mechanisms were produced through the gradual modification of attributes shared with other primates (such as emotions related to complex social lives), with other mammals (such as emotions related to parenting), and even with all vertebrates (such as emotions related to physical danger) (Fessler & Gervais, 2010).

In regard to a relativistic perspective, cultural variation does not imply incommensurability across humans. Researchers have found that purportedly culturally unique emotions can be understood across cultural contexts, even when folk-linguistic terms for the emotion are absent (Breugelmans & Poortinga 2007; Sauter *et al.* 2011). For example, Doi (1971) proposed that the Japanese emotion term *amae* (positive responses to invoking indulgent dependency within a relationship) is culturally unique. However, cross-cultural research reveals that although the emotion of *amae* is experienced differentially across cultures—particularly in the extent to which it is positively or negatively valanced—it can nonetheless be elicited among individuals who do not possess a folk-term for it (Niiya *et al.* 2006), i.e., despite cultural differences in whether the emotion is hyper- or hypocognized (Levy, 1984). Consistent with a middle-ground perspective, across cultures, emotions such as *amae* exist on a continuum of salience, emphasis, and accessibility between those possibilities. Further, cultural variation in emotions may in part be patterned, reflecting functional products of cultural evolution (Fessler, 2006a). For example, the phylogenetically ancient social-hierarchy facet of "shame" is likely to be labeled, prized, reflected upon, and phenomenologically salient in stratified societies, but unmarked and ignored in those that valorize individualism and social mobility (Fessler, 2004). Note that this position does not entail extreme cultural functionalism, as the nature of cultural evolution is such that some of the variation in the many dimensions of emotion may be non-adaptive, yet hold important social relational and culturally constructed meanings nonetheless.

We thus seek to promulgate a middle ground in the ongoing debate between emotion universalists and cultural constructivists wherein the components of emotion are both universal—such as cultures drawing on a basic set of available panhuman emotions (Fessler & Gervais 2010)—and culturally constructed—such as the ways in which those constituent parts

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are then shaped into unique constellations and social relations (e.g., Lutz & White, 1986; Wierzbicka, 1992b). For example, emotions can be felt and experienced differently, elicited by different circumstances, group into different assemblages, be made more or less salient or likely to be experienced, and differentially socially valued. We hope that the examples described above and below usefully illustrate that emotions embody both universal and relativistic properties. A purely ethnographic approach to understanding emotion does not sufficiently illuminate the underlying panhuman structure, just as both a high-level theoretical perspective and a comparative phylogenetic approach are insufficient for understanding specific cultural contexts and the relational implications for individuals situated within those contexts. Melding both approaches is therefore critical in the effort to establish a more complete anthropology of emotion.

Importantly, we do not see our position as radical, as the middle ground in this debate has already been extensively mapped by cultural psychologists and psychological anthropologists who have demonstrated that emotions share certain open-ended features across cultures while also varying substantially in the arrangements and associations of their various components (Lindholm 2005; Quinn 2015; Shweder *et al.* 2008).

We turn next to two specific cases—"anger" and "disgust"—that highlight the interactions between evolved emotional mechanisms and the context-specific cultural constructions that modify and shape those emotions in bounded ways. In so doing, we hope to illustrate the utility of an evolutionary approach for not only uncovering recurrent and consistent patterns of emotion across cultures, but also shedding light on how and why those emotions vary so much between cultures.

Anger

From a baseline evolutionary functionalist perspective, the mechanism underlying what English speakers label "anger" (hereafter, for readability, simply anger) motivates inflicting costs or withholding benefits in response to perceived transgressions or conflicts (Fessler, 2006b; Sell et al., 2009). In both cases, the functional goal is the imposition of net costs on transgressing parties in order to obtain a favorable outcome in a given conflict of interest; to forestall future transgressions; or to make future conflicts of interest more likely to end in favorable outcomes, given the demonstrated ability to impose costs. Such a signal can be directed at both the current transgressor(s) and at other potential future transgressors. However, this is only a general scaffolding for human anger: consonant with the ideas presented above, culture fills in, elaborates on, and transforms that scaffolding into something more concrete. For example, while many societies place a general importance on managing emotions and their behavioral output, destructive emotions in particular—such as anger—are often targets for such social control in order to minimize the costs of disruption (Matsumoto *et al.* 2010). Thus, there is both an underlying, underdetermined universal core feature-set and general function to anger, as well as ample space for culture to change the context of that function, and its relational features to other aspects of encultured lives.

The Pacific has figured prominently in discussions of emotions in general, and of anger in particular (e.g. Levy, 1984; Lutz, 1988). The Kingdom of Tonga, where T.S. has conducted ethnographic research, affords an illustration of the above position. In Tonga, *'ita,* readily recognizable as similar to what English speakers would term *anger*, is negatively valued and feared, and children are socialized from a young age to avoid displays and expressions of it (Morton, 1996). Indeed, the ability to suppress anger is closely associated with acquiring social

competence and adulthood. Open displays of anger are shameful, and individuals are expected to suppress their anger in most social situations (Bender *et al.* 2007). When discussing situations of interpersonal conflict—such as land or business disputes—people rarely openly emote what might be glossed as anger or *'ita*, even when the conflict is clearly frustrating. Situated within a broader context, negative valuations of anger are not uncommon in Polynesia, occurring in similar—although not isomorphic—forms in Tahiti and Samoa (Levy 1975; Steele & McGarvey 1996). This raises the questions of whether Tongans and members of other Pacific island cultures actually experience less anger, and/or whether, for example, conceptualizations of anger in Tonga are incommensurate with conceptualizations in less censorious societies. A purely social constructivist perspective might hold that anger is too differently experienced across cultures to be systematized or compared. Conversely, a rigidly universalist approach would not leave room for the kind of variation in social meanings that results in the hypercognization of anger and its suppression found in Tonga. We believe that the middle-ground approach is the best framework for understanding anger in a cross-cultural context.

Andrea Bender and colleagues sought to systematically understand both the culturally specific elicitation of anger in Tonga and its comparability to anger concepts across cultures (Bender *et al.* 2007, 2012). They find that, while anger is often suppressed in Tonga, it is also phenomenologically similar to anger in other societies in terms of its qualia and many of its folk linguistic concepts. Further, anger is elicited by many of the same triggers, such as norm violations. Hence, even in a culture where anger is censured and regulated, there remains a common underlying experience of anger and its qualia, revealing a core emotional scaffolding shared by humans. However, in addition to anger being expressed less frequently—owing to its negative valuation—there are also culture-specific elicitation contexts, such as a greater role for

rank in determining whether anger is suppressed or expressed (compare with Lutz, 1982). In the Tongan context, anger thus exhibits both universal features and highly contextual manifestations and social meanings.

In some respects, the prominence assigned to anger in Tonga is not unique, as the extent to which some cultures place especially strong boundaries on this emotion is well documented. Famously, Briggs (1970, 1987) describes intense prohibitions among Utku people on expressing anger. From a cultural evolutionary perspective, the circumstances in which anger may be more or less socially valued ought to vary across environments and contexts. When the relative costs of anger for a society are particularly high, groups that suppress anger will thrive more than groups that do not, hence such groups will either attract members from the latter or displace them. In short, in such ecologies, a macro-level form of cultural evolution, *cultural group selection*, will favor elaborate negative valuations of anger. For example, the condemnation of anger and proscriptions on its expression among Utku people, or similar constellations among Faeroe Islanders (Gaffin 1995), can be understood as functional given severe ecological contexts in which individuals are highly interdependent for survival, there is a low margin for error, and lethal vengeance is all too easily enacted. More generally, in societies where individualism is less prominent, greater emphasis may be placed on regulating expressions of anger (Matsumoto *et al.* 2008); conversely, an ethos of extreme individualism may be associated with hypercognizing homicidal violence as a normative expression of anger in contexts such as bereavement (Robarchek & Robarchek 2005). Lastly, in each of these contexts, broader cultural models— including those concerning parenting, social sanctioning, and relational structures in general— constitute cultural attractors for particular construals of anger. In each domain, cultural models reinforce particular valuations of anger, and, in turn, those valuations reinforce said models

during processes of information acquisition, retention, and transmission, resulting in an evolutionarily stable cultural configuration.

In the parlance of the evolutionary social sciences, *evoked culture* refers to psycho-behavioral similarities across members of a group that arise when individuals' biologically evolved psychological mechanisms respond alike to shared social or ecological cues (Tooby & Cosmides 1992). Importantly, evolved mechanisms likely gauge the importance in a given environment of, respectively, cooperating with others (cf. Cosmides & Tooby, 1992; Kameda et al., 2005) or deterring transgression. Potentially acting in parallel with, and reinforcing, the processes described in the previous discussion, these mechanisms probably increase the intuitive appeal of corresponding socially transmitted values that proscribe or prescribe anger. Hence, while unalloyed evoked-culture phenomena may be uncommon, it is likely that evolved psychological mechanisms often create cultural attractors that shape the acceptance, retention, modification, enactment, and transmission of cultural models addressing significant experiences and behaviors, including both the elicitation and the expression of anger.

Disgust

Disgust is another emotion that illustrates how evolved psychological and cultural systems jointly produce psychological traits, demonstrating the utility of applying an evolutionary lens to the cross-cultural study of human psychology and emotions. Disgust highlights a) the ways in which particular constellations of emotion address specific adaptive challenges, b) the tendency for both biological and cultural evolution to re-use mental architecture and mechanisms, and c) the role of culture in shaping and co-opting those

adaptations in profound ways, without erasing the underlying adaptive functions. We address each of these three points in turn.

Part of a broader suite of psychological processes and behaviors designed to address the phylogenetically ancient threat posed by disease, disgust originally evolved as a defensive behavioral mechanism for ameliorating the costs of pathogens (see Ackerman et al., 2018; Tybur et al., 2013), in part by deterring ingestion of potential sources of pathogens; by triggering emesis if contaminants have been consumed; by generally avoiding contact with substances likely to bear microbes; and by avoiding close contact with individuals who display cues of infection. The evolutionary function of pathogen disgust is revealed by the details of its mechanism, and by its phylogenetic history. First, substances that, across cultures, frequently elicit disgust—such as feces, blood, and other bodily substances, rotting food, and, more broadly, visual and olfactory indices of putrefaction—are also likely to contain pathogens (Curtis & Biran 2001). Second, cues of disease oftentimes motivate avoidance of potentially infected agents (Schaller 2011). Third, revealing the importance of its adaptive function, pathogen disgust may be phylogenetically ancient and fairly conserved over evolution—many animal species possess ingestion-rejection systems, and there is evidence that primates engage in other disease prophylaxis, such as avoidance of feces and infected conspecifics (see Fessler & Gervais, 2010; Nunn & Altizer, 2006).

Disgust also illustrates some of biological evolution's mechanistic properties, in particular the common pattern wherein an adaptation is modified by selection to address a new or different adaptive goal (Holbrook & Hahn-Holbrook, 2022) – a pattern explicable in terms of competition among variations present in a population at a given time, such that natural selection acts as "a tinkerer, not an engineer" (Jacob 1977). This highlights some of the utility of applying

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an evolutionary approach to studying human psychology cross-culturally, as integrating across different levels of explanation reveals underlying shared connections between emotions that may be construed and configured in a variety of ways across cultures. While pathogen disgust is explicable as an emotional mechanism for regulating exposure to disease threats, disgust can also motivate avoidance of other sources of fitness reduction. By processes of serial homology of psychological traits (Moore 2013) whereby evolutionary structures are duplicated and modified to address new functions, disgust has been reused by natural selection to motivate the avoidance of threats other than pathogens (Holbrook & Fessler 2015). First, researchers have proposed that sexual disgust spurs avoidance of costly sexual behavior (Tybur et al., 2009). Reflecting overlapping biological mechanisms in the appetitive components of hunger and sexual desire (reviewed in Fessler, 2003), disgust is antithetical not only to ingesting food, but also to sexual arousal. This is most starkly evident in the case of human inbreeding avoidance. While cultural kinship systems and sexual taboos provide a rich conceptual landscape within which marriage and mating occurs, underlying this symbolic environment is a biologically-evolved mechanism that processes cues of biological relatedness (childhood propinquity and perinatal maternal-infant association) which then articulates with sexual disgust to avoid the fitness costs associated with inbreeding while still allowing for close affiliative relationships with kin (Lieberman *et al.* 2007).

Moral disgust constitutes a third disgust domain alongside pathogen disgust and sexual disgust. Moral disgust is undoubtably more phylogenetically recent, as it is an adaptation for addressing some of the potential costs and benefits associated with the encultured lives of humans (Rozin *et al.* 2008). Specifically, moral disgust, elicited by transgressions of important moral rules or norms, motivates avoiding social contact or association with those who commit

such transgressions. Although these transgressions can involve behaviors that are often broadly considered antisocial across societies, including lying, stealing, and inflicting harm on ingroup members (Tybur *et al.*, 2009), they can also be highly parochial, relevant only to a particular society's norms, conventions, and beliefs. Therefore, even more so than pathogen disgust and sexual disgust, moral disgust is subject to cultural influence, supporting the creation of culture-bound emotion assemblages that generate society-specific relational structures.

Arguably, the basic architecture of disgust includes the open-endedness so clearly evident in moral disgust. Being dietary generalists occupying a wide variety of ecosystems, humans are fundamentally reliant on cultural transmission in learning what to eat and what not to eat. As a consequence, even the meaning of elementary gustatory and olfactory cues can vary across cultural cuisines (Rozin 1987). With its central focus on the mouth and the regulation of ingestion (Fessler & Haley, 2006; Kupfer *et al.*, 2021; compare with Rozin *et al.*, 2008), pathogen disgust plays a key role in this process, as evidenced by the importance of disgust in culturally parochial food taboos – prescriptions that, while often serving important purposes in marking group membership, are mostly not functional on disease-avoidance or dietary grounds (Fessler & Navarrete, 2003). Likewise, the role of sexual disgust in inbreeding avoidance may provide a further bridge between a phylogenetically ancient precultural system and one in which the acquisition of socially-transmitted moral rules is central, as disgust appears to be important in motivating the enforcement of incest taboos despite their variable configurations across cultures.

Clearly, the role of cultural learning in disgust has been extensively elaborated in moral disgust. This is in keeping with the fact that conformity to—and enforcement of—moral rules is central to success in all societies, yet the contents of such rules differ substantially from culture to culture. In all societies, interacting with moral transgressors entails costs—either directly,

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because of transgressors' unreliability as cooperative or norm-following partners, or their propensity to inflict harm, or indirectly, because of perceived guilt-by-association on the part of other group members. Cooperation and coordination are maintained in human societies not simply by punishment of rule violators, but also by higher-order punishment, that is, costs inflicted on those who fail to punish rule violators (Henrich *et al.* 2006). Given the gains to be obtained by inclusion in group activities, ostracism offers a relatively efficient form of punishment (in that it is more costly to the punished than to the punisher), one which can readily be scaled up to higher-order punishment (i.e., ostracism of those who fail to ostracize rule violators) (e.g. von Rueden & Gurven, 2012). Moral disgust evinces properties ideally suited for this function, as, building on features that originally evolved for purposes of avoiding infectious individuals, it motivates social distancing from, and avoidance of, norm violators and moral transgressors, driving behavior as if moral failings were actually contagious (see Giner-Sorolla et al., 2017). For example, Lutz (1982) describes the Ifaluk term *niyabut*, "disgust", as prototypically elicited by a spoiled or fetid object, yet also linked to *gasechaula,* "hate", and capable of precipitating *ma*, "shame/embarrassment" when directed at individuals who fail to adhere to social standards (compare with Fessler [1999, 2004] regarding relationships between disgust, contamination, and *malu*, "shame", in Bengkulu, Indonesia).

The structure of disgust is such that versions of the emotion effectively serve the goals of avoiding pathogens, avoiding inbreeding, and avoiding interactions with socially sanctioned individuals. Across evolutionary time, disgust has thus been repeatedly duplicated and modified so as to drive avoidance of differing fitness-reducing contexts. Given this duplication, and the wide range of culturally dependent parameters that structure costs in the local environment, disgust should be subject to substantial cultural modification, yet still preserve the core functions

of the evolved architecture. Speculatively, openness to cultural modification may parallel the phylogeny of this emotion, such that the oldest version of the serial homology, pathogen disgust, while somewhat modifiable, is considerably less variable across cultures (see, for example Curtis & Biran, 2001; Elwood & Olatunji, 2009) than the newest version, moral disgust, with sexual disgust being intermediate in this regard. Importantly, these three disgust domains are not necessarily an exhaustive taxonomy, as cultural evolution and/or ontogeny can also take advantage of the capacity for homology to create culture-bound emotion homologues (Holbrook & Hahn-Holbrook, 2022). That is, paralleling processes of biological evolution, societies may draw on psychological adaptations to create parochial disgust homologues that respond to distinct domains outside of the three described above. Ethnographic work in psychological anthropology is uniquely well-positioned to uncover what some of those constellations might be, which in turn can inform evolutionary perspectives on disgust.

As noted previously, in cultural evolution, multiple cultural attractors can reinforce one another, leading to constellations of beliefs, values, and practices that can be highly stable over time. Anthropologists have long recognized the importance of purity concepts across cultures (Douglas, 2002; Shweder et al., 1997), as well as the relationship between gustatory and moral disgust (Wierzbicka 1992a). Because the evolved psychological mechanisms undergirding, respectively, pathogen disgust, sexual disgust, and moral disgust are each capable of powerfully motivating behavior, and are each in part dependent on cultural input, when cultural understandings link concepts of contamination, sexuality, and moral disapprobation, the result is a powerful cultural attractor that can play a role in anchoring entire assemblages of ideas and practices. As illustrated by what have been termed the purity cultures of South Asia, such assemblages can form the foundation of cultural systems that endure for millennia.

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While cultural-level variation is an important determinant of disgust, we do not wish to imply that variation only occurs across societies, nor do we mean to essentialize cultural differences. More broadly, within social groups, cultural concepts are always heterogenous and variant across individuals (Schwartz 1978). Correspondingly, disgust also varies within societies, across individuals and contexts. For example, disgust may vary across individuals partly as a function of risk-proneness (Sparks *et al.* 2018), and social preferences (Tybur et al., 2016), and vary across contexts as a function of disease exposure (Hlay *et al.* 2021), and kinship and social closeness (e.g. Tybur et al., 2020). This variation provides grist for further interaction between disgust and culture. For example, individuals who more strongly endorse their own society's norms are also more likely to experience disgust (Tybur et al., 2016). In addition, the relationship between disease avoidance and individual endorsement of traditional norms varies across social contexts as a function of complex interactions with the cultural milieu (Samore *et al.* 2021, 2022).

Taken in sum, an evolutionary perspective on disgust illustrates the utility of adopting a middle-ground approach between universalist and constructivist perspectives on emotion. The universalist position fails to appreciate that the wide diversity of disgust elicitors and experiences across cultures, and the important role that institutions and collectively realized relational models play in shaping those elicitors and experiences. Hence, universalists mistakenly devalue the importance of an anthropological, cross-cultural approach to disgust and the mind. Psychological anthropologists' in-depth, person-centered ethnographies provide rich contexts for discovering culture-bound emotion homologues and constellations. Conversely, the constructivist perspective fails to recognize that recurrent features of the phenomenology of disgust across cultures are reflective of a common function and shared panhuman cognitive architecture, thus leading to a

fragmented and siloed understanding of emotions. In contrast to each of these polar approaches, a middle-ground evolutionary perspective can aid in both systematizing knowledge and generating hypotheses regarding disgust in particular, and emotions in general, thus illustrating the potential for highly productive collaboration between psychological anthropology and the evolutionary social sciences.

Conclusion

We think that some of the most productive scholarship arises from the fertile ground that lies between disciplines. Given the complementary strengths of evolutionary anthropology and psychological anthropology, we hope that we have illustrated some of the pathways for such synergistic exchanges. Although an evolutionary approach is not always necessary or even useful, many of the research questions addressed in psychological anthropology could benefit from incorporating some of the evolutionary perspectives presented here. In particular, an evolutionary lens can be useful for connecting rich ethnographic observations and more general cultural processes that have been addressed in cognitive anthropology, such as the means by which individuals instantiate and transform cultural information. Although similar enterprises have been pursued for decades within psychological anthropology, this has largely been done without the benefit of recent advances in the evolutionary social sciences, including models that specify the composition of the mind as a large set of evolved adaptations, and the mechanics of the relationship between culture and the mind.

While we wish to skirt debates within anthropology regarding the relative merits of positivism versus interpretivism, it seems reasonable to assume that, whether the goal is hypothesis testing or interpretation, many anthropologists would see their enterprise as most

productive when grounded in a framework that is convergently supported by—or at least congruent with—other evidence. It is therefore worth noting that, while various versions of psychoanalytic theory continue to be employed in the humanities (Yeung 2021) and some branches of psychological anthropology (see Groark, this volume), in contrast to the rapidly increasing impact of evolutionary approaches, psychoanalytic models have been abandoned in psychology (Yeung 2021) due to the resounding lack of empirical evidence (Paris 2017). Importantly, the evolutionary psychological and cultural evolutionary perspectives touched on in this chapter are not solely applicable to hypothesis generation in quantitative research. They can also be useful interpretative frameworks in qualitative work (cf. Heywood *et al.* 2010), orienting ethnographers toward particular features of, for instance, different cultural practices, including norms, traditions, and rituals. Likewise, theories of cultural evolution can help guide qualitative research when considering similarities and differences across cultures and contexts.

Concordantly, psychological anthropology is uniquely positioned to study how portions of the full palette of evolved emotions are combined, emphasized, or ignored to create distinct, and richly diverse, cultural emotion schemas and corresponding experiences. Longstanding research traditions in psychological anthropology, such as person-centered ethnography and phenomenology, can be enriched by evolutionary approaches, as the latter specify the contents of that panhuman emotion palette, and where either overlapping adaptive functions, phylogenetic derivations, or both create natural groupings that will often color a culture's resulting tableau. An approach that combines deep ethnographic understanding with a contemporary evolutionary perspective can thus help illuminate and clarify the possibilities for difference and similarity in emotions across humans.

These dynamics speak to the fruitfulness of collaboration in academia. Perhaps for historical reasons related to the discipline's cultural expectations about the nature of fieldwork and ethnography, collaboration is particularly infrequent in anthropology. We view this as both deeply unfortunate and highly inefficient. Anthropology is a large field, with diverse perspectives and knowledge, hence there is enormous opportunity to leverage complementary expertises through collaborations across subfield lines. Given the pragmatic obstacles to acquiring expertise in all subfields, collaboration provides a means for psychological anthropologists and evolutionary anthropologists to productively and expertly blend approaches, potentially generating many important new insights.

Finally, while we have primarily focused on research in evolutionary anthropology that we think may be valuable for psychological anthropology, as we stated in the introduction, we believe that it is equally important for evolutionary anthropologists to learn about many of the important ongoing contributions made by psychological anthropologists. As one example, the kind of reflexivity and community engagement that have become increasingly central in psychological anthropology have regretfully yet to influence much evolutionary social science. Hopefully, this chapter will inspire future efforts among psychological anthropologists to engage in dialogue with their evolutionary colleagues, including along these lines.

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Chapter 1 Supplementary Materials

Supplementary Procedure

Studies 1 and 2 composite scales

Full survey items can be found in the open archives.

Political orientation composites: Modification of Dodd et al.'s (2012) version of Wilson and Patterson's (1968) issues index.

> Please indicate whether you agree or disagree, or are uncertain, with regard to each topic listed below. [agree, disagree, uncertain]

Social conservatism composite:

1. Women's equality (r)
2. Charter schools
3. Prayer in public schools
4. Pornography (r)
5. Death penalty
6. Premarital sex (r)
7. Gay marriage (r)
8. Abortion rights (r)
9. Theory of evolution (r)
10. Biblical truth

Economic conservatism composite:

1. Welfare spending (r)
2. Tax cuts
3. Pollution control (r)
4. Aid to foreign countries (r)

5. Socialism (r)

6. Globalization (r)

7. Small government

Militaristic conservatism composite:

1. Bomb cities controlled by terrorists

2. Gun control (r)

3. Military spending

4. Warrantless searches

5. Obedience to authorities

6. Compromise/negotiation with enemies (r)

7. Use nuclear weapons against threats to the US

8. Drone attacks on terror suspects

9. Illegal immigration

10. Waterboarding terror suspects

11. Patriotism

12. Pacifism (r)

Right-wing authoritarianism composites: Aggression-Submission-Conventionalism authoritarianism scale (Dunwoody & Funke, 2016).

The following questions concern values that people may or may not hold. Please select a number to indicate the degree to which you agree or disagree with each statement. [1 – strongly disagree … 7 – strongly agree]

Traditionalism:

1. People emphasize tradition too much. (r)

2. It would be better for society if more people followed social norms.

3. People should respect social norms.

4. Traditions are the foundation of a healthy society and should be respected.

5. Traditions interfere with progress. (r)

6. People should challenge social traditions in order to advance society. (r)

Authoritarian aggression:

1. People should avoid using violence against others even when ordered to do so by the proper authorities. (r)
2. Using force against people is wrong even if done so by those in authority. (r)
3. Strong punishments are necessary in order to send a message.
4. Strong force is necessary against threatening groups
5. It is necessary to use force against people who are a threat to authority.
6. Police should avoid using violence against suspects. (r)

Submission to authority:

1. Our leaders know what is best for us.
2. People should be critical of statements made by those in positions of authority. (r)
3. People should be skeptical of all statements made by those in positions of authority. (r)
4. We should believe what our leaders tell us.
5. People in positions of authority generally tell the truth.
6. Questioning the motives of those in power is healthy for society. (r)

Social dominance orientation composite: Four-item Short Social Dominance Orientation Scale (Pratto et al., 2013).

There are many types of groups in the world: men and women, ethnic and religious groups, nationalities, political factions, etc. Please select a number to rate the degree to which you oppose or favor each statement about groups, where higher numbers mean you favor the statement more, and lower numbers mean you oppose the statement more. [1 – extremely oppose … 7 – extremely favor]

1. In setting priorities, we must consider all groups. (r)
2. We should *not* push for group equality.
3. Group equality should be our ideal. (r)
4. Superior groups should dominate inferior groups.

Pathogen disgust sensitivity composite: Pathogen subscale of the Three-Domain Disgust Scale (Tybur et al., 2009).

Please rate how disgusting you find the concepts described in the items by selecting a number, where lower values mean that you find the concept less disgusting, and

higher values mean that you find the concept more disgusting. [1 – not at all disgusting … 7 – extremely disgusting]

1. Stepping on dog poop
2. Sitting next to someone who has red sores on their arm
3. Shaking hands with a stranger who has sweaty palms
4. Seeing some mold on old leftovers in your refrigerator
5. Standing close to a person who has body odor
6. Seeing a cockroach run across the floor
7. Accidentally touching a person's bloody cut

COVID-19 precautionary health behaviors composite:

On average, how often do you currently… [1 – Never … 7 – As often as possible]

1. Wash your hands each day?
2. Use hand sanitizer each day?
3. Disinfect surfaces in your house, like doorknobs or counters, each day?
4. Take supplements to boost your immune system?

Within the last 10 weeks, it has been important to me that (I / my household) make an effort to stock up on... [1 – Not at all important … 7 – Extremely important]

1. Cleaning supplies (such as bleach, disinfectant spray, disinfectant wipes, etc.)
2. Hand sanitizer/hand soap
3. Masks and gloves

When you leave your home, how often do you do each of the following? [1 – Never… 7 – Always]

1. Wear a mask
2. Wear gloves
3. Stay farther than 6 feet away from people

To what extent are you following your local and state lockdown restrictions? [1 – Never follow… 7 – Always follow]

To what degree were you careful in the last week to keep your distance from people outside your household? [1 – Not careful at all… 7 – As careful as possible]

Trust composites:

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How much do you think the following sources of information provide advice based on accurate information about what to do during the COVID-19 outbreak? Please select a number, where higher numbers mean you think the source is more accurate, and lower numbers mean you think the source is less accurate [1 – Not accurate at all … 7 – Extremely Accurate (I don't know = NA)]

Trust in liberals and moderates composite:

1. Liberal journalists
2. Centrist journalists
3. MSNBC
4. CNN
5. The New York Times
6. USA Today
7. The Young Turks
8. Chris Hayes
9. Rachel Maddow
10. Lawrence O'Donnell

Trust in conservatives composite:

1. Donald Trump
2. Fox News
3. Breitbart
4. Sean Hannity
5. Tucker Carlson
6. Rush Limbaugh
7. Conservative journalists

Trust in scientists composite:

1. Dr. Anthony Fauci
2. Centers for Disease Control and Prevention (CDC)
3. Health care providers
4. Medical scientists

COVID-19 domain-specific threat-assessments composite: Higher scores indicate finding the direct health consequences of the pandemic less serious, particularly in contrast to other COVID-19-related harms such as threats to personal liberties and the economy.

During the current COVID-19 outbreak, how focused are you on doing the following? [1 – Not focused at all … 7 – As focused as possible]

1. Speaking out to defend personal liberties

How concerned are you about… [1 – Not at all concerned … 7 – Extremely concerned]

1. Personally getting COVID-19 (r)
2. A family member getting COVID-19 (r)
3. Transmitting COVID-19 to a family member (r)
4. Transmitting COVID-19 to a stranger (r)
5. Transmitting COVID-19 to someone I live with (r)
6. The economic effects of the COVID 19 outbreak
7. Losing personal liberties because of COVID-19 lockdown orders

Within the last 10 weeks, it has been important to me that (I / my household) make an effort to stock up on guns and ammunition [1 – Not at all important… 7 – Extremely important]

How severe would the consequences of catching COVID-19 be to… [1 – Extremely small consequences … 7 – Extremely large consequences]

1. Your own health (r)
2. The health of your family members and loved ones (r)
3. The health of people in your local community (r)

How much more concerned would you be about COVID-19 if you DID NOT engage in protective behaviors? (r) [1 – No difference in concern … 7 – Intensely more concerned]

Please indicate how strongly you agree or disagree with each of the following statements [1 – Strongly disagree … 7 – Strongly agree]

1. I think that the risk of the COVID-19 outbreak has been overstated in the media.

2. I think that the worst of the COVID-19 outbreak has already occurred.

3. I am confident that this country will have COVID-19 under control by October 1st.

4. I think that the economic costs of the COVID-19 response outweigh the public health benefits.

5. I think that the threat of COVID-19 is overblown.

6. The costs to personal liberty as a result of the response to the COVID-19 outbreak outweigh the public health benefits

COVID-19 economic precautions composite:

During the current COVID-19 outbreak, how focused are you on doing the following? [1 – Not focused at all … 7 – As focused as possible]

1. Saving money

2. Reducing discretionary spending

3. Delaying major financial decisions

4. Preparing for a major economic downturn

Within the last 10 weeks, it has been important to me that (I / my household) make an effort to stock up on cash [1 – Not at all important… 7 – Extremely important]

News consumption composites:

On a scale from 1 to 7, how often do you watch, listen to, or read news from the following outlets? [1 – Never … 7 – Very frequently]

Liberal news media consumption composite:

1. CNN

2. The New York Times

3. The Washington Post

4. Slate

5. The Atlantic Monthly

6. The New Yorker

7. NBC news

8. Politico

9. Buzzfeed News

10. MSNBC

Conservative news media consumption composite:

1. Fox News
2. Breitbart
3. Infowars
4. The Federalist
5. The Daily Caller
6. National Review
7. Washington Examiner
8. RedState

Centrist news media consumption composite:

1. The Wall Street Journal
2. USA Today
3. FiveThirtyEight
4. NPR

Endorsement of public health interventions composite:

Please indicate how strongly you agree or disagree with each of the following statements [1 – Strongly disagree … 7 – Strongly agree]

1. The government should be able to set public health policies that restrict tobacco use (r)
2. Others' tobacco use poses a danger to my personal health (r)
3. Unrestricted tobacco use is a matter of personal liberty

Political affiliation closeness composite:

Please indicate how strongly you agree or disagree with each of the following statements [1 – Strongly disagree … 7 – Strongly agree]

1. I identify with other members of [relevant political affiliation inserted here]
2. I am like other members of [relevant political affiliation inserted here]
3. [Relevant political affiliation inserted here] is an important reflection of who I am
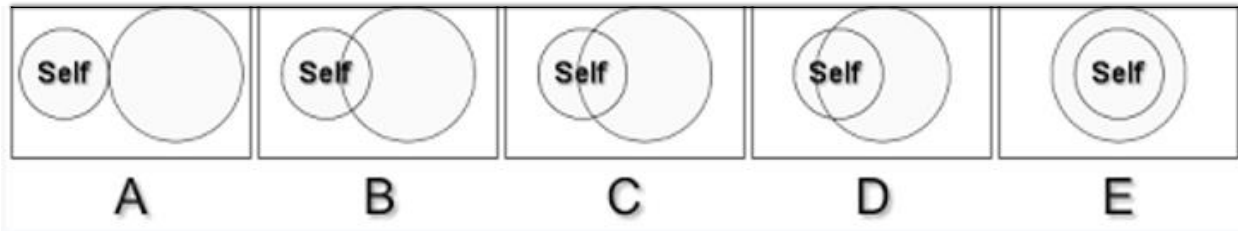
Which picture best represents the way you perceive your relationship with the [relevant political affiliation inserted here]? [A … E]

Pilot Study scales

COVID-19 precautionary health behaviors composite, Pilot Study version:

On average, how often do you currently… [1 – Never … 7 – As often as possible]

1. Wash your hands each day?
2. Use hand sanitizer each day?
3. Disinfect surfaces in your house, like doorknobs or counters, each day?

Within the last 10 weeks, it has been important to me that (I / my household) make an effort to stock up on... [1 – Not at all important … 7 – Extremely important]

1. Cleaning supplies (such as bleach, disinfectant spray, disinfectant wipes, etc.)
2. Hand sanitizer
3. Hand soap

When you leave your home, how often do you do each of the following? [1 – Never… 7 – Always]

1. Wear a mask
2. Wear gloves
3. Stay farther than 6 feet away from people

To what extent are you following your local and state lockdown restrictions? [1 – Never follow … 7 – Always follow (not applicable = NA)]

COVID-19 domain-specific threat-assessments composite, Pilot Study version: Higher scores indicate finding the direct health consequences of the pandemic less serious, particularly in contrast to other COVID-19-related harms such as threats to the economy.

How concerned are you about… [1 – Not at all concerned … 7 – Extremely concerned]

1. Personally getting COVID-19 (r)

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2. Transmitting COVID-19 to someone else (r)

How much of a risk do you think COVID-19 directly poses to… [1 – Extremely small risk … 7 – Extremely large risk]

1. Your health (r)
2. The health of your family members and loved ones (r)

How worried are you about the future financial repercussions of the COVID-19 outbreak? [1 – Not worried at all … 7 – Extremely worried]

Please indicate how strongly you agree or disagree with each of the following statements [1 – Strongly disagree … 7 – Strongly agree]

1. I think that the risk of the COVID-19 outbreak has been overstated in the media.
2. I think that the worst of the COVID-19 outbreak has already occurred.
3. I am confident that this country will have COVID-19 under control by September 1st.
4. I think that the economic costs of the COVID-19 response outweigh the public health benefits.
5. I think that the threat of COVID-19 is overblown.
6. I think that many of my family and friends could get coronavirus, but by and large we'll be fine.

Pathogen disgust sensitivity images composite: Modified version of Curtis et al.'s (2004) visual disgust sensitivity measure. Note that images containing potentially identifying information have been removed. See Curtis and colleagues (2004) for full measure.

Please rate how you feel toward each of the following images. [1 – Not at all disgusting … 7 – Extremely disgusting]

1.

2.
3. redacted
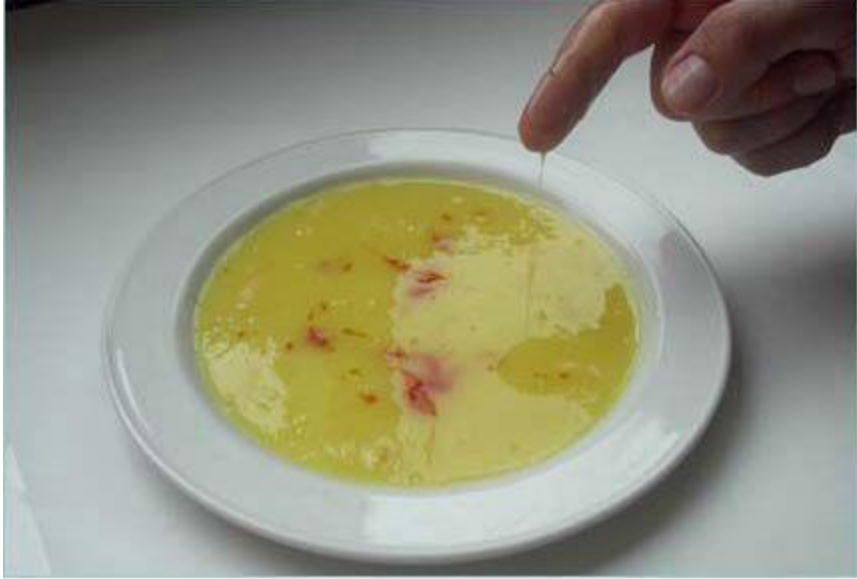
4.
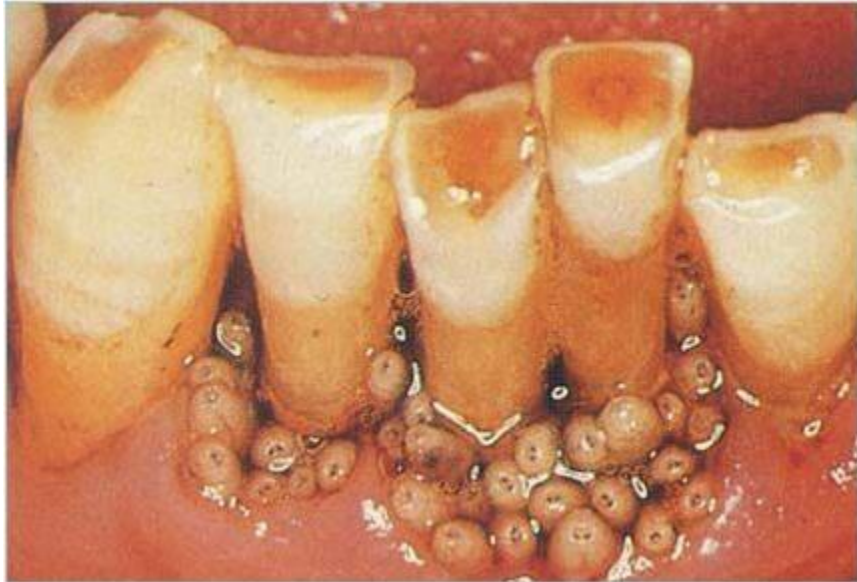
5.

6.

7. redacted

8.

Analysis software

We used R (R Core Team, 2020) and the R-packages *car* (Fox & Weisberg, 2019), *corrplot* (Wei

& Simko, 2017), *cowplot* (Wilke, 2019), *dplyr* (Wickham et al., 2020) , *ggpmisc (*Aphalo, 2020)*,*

ggplot2 (Wickham, 2016), *ggpubr* (Kassambara, 2020), *GPArotation* (Bernaards & Jennrich,

2005), *gridExtra* (Auguie, 2017), *interactions* (Long, 2019), *likert* (Bryer & Speerschneider,

2016), *lm.beta* (Behrendt, 2014), *MASS* (Venables & Ripley, 2002), *papaja* (Aust & Barth,

2020), *parameters (*Lüdecke, Ben-Shachar & Makowski, 2020*), psych* (Revelle, 2019), *purr* (Henry & Wickham, 2020), *readxl* (Wickham & Bryan, 2019), *sjPlot* (Lüdecke, 2020), *stringr* (Wickham, 2019), *tibble* (Müller & Wickham, 2020), *tidyr* (Wickham & Henry, 2020), *wesanderson* (Ram & Wickham, 2018), and *yarrr* (Phillips, 2017) for our analyses. The code that produced all analyses in the main text and supplement is openly available.

Differences between pre-registration, and final manuscript

There are several differences between the pre-registered measures and those reported in the main text and supplement. Here, we explain those differences.

- COVID-19 precautionary behaviors composite measure: We originally asked participants about precautionary behaviors that ultimately did not make it into the final composite measure used in analyses here. More specifically, participants were asked how much of an effort they had made to acquire supplies such as toilet paper and canned foods. However, the precautionary behaviors composite is designed to measure health precautions specifically, and not non-health related behaviors that may result from more downstream consequences of the COVID-19 outbreak (such as shortages of food and toilet paper in stores early in the pandemic). Therefore, upon reflection, we realized that it would be erroneous to include those items in a measure of health/pathogen avoidance precautions, and those items were excluded from analysis.

- Moral disgust: In the original survey, in addition to asking participants about pathogen disgust sensitivity using the pathogen subscale of the Three-Domain Disgust Scale (Tybur et al., 2009), participants were also asked about their moral disgust sensitivity using the moral subscale of that same scale. We reserve the analyses of this measure for a separate project, and thus do not include them here.

- Disease threat sensitivity: In the original survey, we asked participants about the perceived threat posed by non-COVID-19 diseases, such as Lyme disease and Ebola, in order to measure pathogen avoidance across a broader range of threats, which could then be compared to pathogen avoidance for COVID-19 in particular. We reserve the analyses of this measure for a separate project, and thus do not include them here.

- News media consumption composites: In the main text, we describe the process of creating two partisan news consumption composites (liberal-leaning, and conservative-leaning; the moderate-leaning composite was dropped due to a lack of reliability), based on the Allsides Media Bias ratings (*AllSides Media Bias Ratings*, 2020), a third-party organization that uses a variety of methods to rank the partisan leanings of different news sources. However, several of the news sources that we had originally thought might be useful turned out not to have been rated by Allsides, hence we did not include them in any of the composites. Those news sources were as follows: The Rush Limbaugh Show, STAT News, and the Young Turks. Additionally, participants were asked how often they consumed local broadcast news, and news from social media. Because those sources cannot be placed in any particular partisan-leaning composite, they were also excluded.

- COVID-19 domain-specific threat assessment composite: This composite was designed to measure the extent to which participants thought that the direct health threats of the COVID-19 outbreak were serious, especially in relation to the economic and personal liberty threats that may be downstream consequences of the pandemic. This scale originally included a question that stated, "If we do as we're told by the authorities about COVID-19, everything will be fine". However, upon further reflection, we realized that this item did not capture opinions about any of the specific threat domains. Further, we

also asked participants how concerned they were about what the COVID-19 outbreak would do to the country. However, we realized that this item was underspecified, as it is impossible to determine what aspects of the pandemic participants were attending to when answering the question. Therefore, these variables were excluded from the final composite measure used for analysis.

- Engagement in non-socially distant behaviors: In the Studies 1 and 2 surveys, as an additional measure of COVID-19-related behavior, a set of five items were originally included that asked participants how often in the last week (from 0 times to 15 times) they had engaged in a series of behaviors related to social distancing (e.g., "In the last week, how often have you … attended a large social gathering … gone to a meeting in person" … etc.). However, in Study 1, 86% of participants reported engaging in zero of those behaviors within the last week, and in Study 2, 92% indicated as such. As a result of this extremely skewed distribution, such that the vast majority of responses were zero, these variables were not analyzed.

- Religiosity items: The original surveys included a number of items related to religiosity, including beliefs and practices regarding prayer, trust in the perceived accuracy of religious leaders in relation to COVID-19 information, and belief in God or other deities. We reserve the analyses of these items for a separate project, and thus do not include them here.

- Disgust ratings of images: In the Pilot Study, in addition to the images that constituted the pathogen disgust sensitivity images composite, participants ranked the disgustingness of a variety of other images that lacked overt pathogen cues, such as images with endoparasite cues (e.g., wasps), and items that would not typically elicit disgust (e.g. an

empty train, a soccer ball). We reserve the analyses of these items for a separate project, and thus do not include them here.

- In addition to these methodological differences, there was also a change to the pre-registered analytical strategy in Studies 1 and 2. More specifically, in the pre-registration we specified that we would use best subset selection and information criteria to compare the importance of different predictors. However, we later decided that this analytical approach was not suitable for testing the relative strength of the different political variables in associating with COVID-19 precautions. Instead, we decided to compare these variables within models by examining coefficients after accounting for the effects of the comparison variables. In sum, the conceptual goal of the pre-registered set of analyses—to compare the relative effects of different independent variables—was preserved, although the analytical techniques were changed.

Software version and source information

The reproducibility of the analyses found in the main text and supplement depend upon a set of R packages. It is possible that future updates to these packages could disrupt the functionality of the code. In anticipation of this possibility, we list the versions and sources of all required packages.

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- Session info ---------------------------------------------------------------------
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 version  R version 4.0.2 (2020-06-22)
 os       Windows 10 x64
 system   x86_64, mingw32
 ui       RStudio
 language (EN)
 collate  English_United States.1252
 ctype    English_United States.1252
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tz   America/Denver

date   2020-08-06

- Packages ---

package	*	version	date	lib	source
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assertthat		0.2.1	2019-03-21	[1]	CRAN (R 4.0.0)
backports		1.1.8	2020-06-17	[1]	CRAN (R 4.0.0)
BayesFactor	*	0.9.12-4.2	2018-05-19	[1]	CRAN (R 4.0.0)
bayestestR	*	0.7.2	2020-07-20	[1]	CRAN (R 4.0.2)
boot		1.3-25	2020-04-26	[2]	CRAN (R 4.0.2)
broom		0.7.0	2020-07-09	[1]	CRAN (R 4.0.2)
callr		3.4.3	2020-03-28	[1]	CRAN (R 4.0.0)
car	*	3.0-8	2020-05-21	[1]	CRAN (R 4.0.0)
carData	*	3.0-4	2020-05-22	[1]	CRAN (R 4.0.0)
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circlize	*	0.4.10	2020-06-15	[1]	CRAN (R 4.0.2)
cli		2.0.2	2020-02-28	[1]	CRAN (R 4.0.0)
coda	*	0.19-3	2019-07-05	[1]	CRAN (R 4.0.0)
colorspace		1.4-1	2019-03-18	[1]	CRAN (R 4.0.0)
correlation	*	0.3.0	2020-06-19	[1]	CRAN (R 4.0.2)
corrplot	*	0.84	2017-10-16	[1]	CRAN (R 4.0.0)
cowplot	*	1.0.0	2019-07-11	[1]	CRAN (R 4.0.0)
crayon		1.3.4	2017-09-16	[1]	CRAN (R 4.0.0)
curl		4.3	2019-12-02	[1]	CRAN (R 4.0.0)
data.table		1.13.0	2020-07-24	[1]	CRAN (R 4.0.2)
desc		1.2.0	2018-05-01	[1]	CRAN (R 4.0.0)
devtools		2.3.1	2020-07-21	[1]	CRAN (R 4.0.2)
digest		0.6.25	2020-02-23	[1]	CRAN (R 4.0.0)
dplyr	*	1.0.0	2020-05-29	[1]	CRAN (R 4.0.0)
effectsize	*	0.3.2	2020-07-27	[1]	CRAN (R 4.0.2)
ellipsis		0.3.1	2020-05-15	[1]	CRAN (R 4.0.0)
emmeans		1.4.8	2020-06-26	[1]	CRAN (R 4.0.2)
estimability		1.3	2018-02-11	[1]	CRAN (R 4.0.0)

evaluate   0.14   2019-05-28 [1] CRAN (R 4.0.0)

fansi   0.4.1   2020-01-08 [1] CRAN (R 4.0.0)

forcats   0.5.0   2020-03-01 [1] CRAN (R 4.0.0)

foreign   0.8-80   2020-05-24 [2] CRAN (R 4.0.2)

fs   1.4.2   2020-06-30 [1] CRAN (R 4.0.2)

generics   0.0.2   2018-11-29 [1] CRAN (R 4.0.0)

ggeffects   0.15.1   2020-07-27 [1] CRAN (R 4.0.2)

ggplot2   * 3.3.2   2020-06-19 [1] CRAN (R 4.0.2)

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ggpubr   * 0.4.0   2020-06-27 [1] CRAN (R 4.0.2)

ggridges   0.5.2   2020-01-12 [1] CRAN (R 4.0.0)

ggsignif   0.6.0   2019-08-08 [1] CRAN (R 4.0.0)

GlobalOptions 0.1.2   2020-06-10 [1] CRAN (R 4.0.2)

glue   1.4.1   2020-05-13 [1] CRAN (R 4.0.0)

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gtools   3.8.2   2020-03-31 [1] CRAN (R 4.0.0)

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hms   0.5.3   2020-01-08 [1] CRAN (R 4.0.0)

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interactions * 1.1.3   2020-04-04 [1] CRAN (R 4.0.0)

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jtools   2.1.0   2020-06-23 [1] CRAN (R 4.0.0)

knitr   1.29   2020-06-23 [1] CRAN (R 4.0.0)

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lifecycle   0.2.0   2020-03-06 [1] CRAN (R 4.0.0)

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magrittr   1.5   2014-11-22 [1] CRAN (R 4.0.0)

MASS   * 7.3-51.6 2020-04-26 [2] CRAN (R 4.0.2)

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memoise   1.1.0   2017-04-21 [1] CRAN (R 4.0.0)

minqa   1.2.4   2014-10-09 [1] CRAN (R 4.0.0)

mnormt   2.0.1   2020-06-29 [1] CRAN (R 4.0.2)

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munsell   0.5.0   2018-06-12 [1] CRAN (R 4.0.0)

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nloptr   1.2.2.2   2020-07-02 [1] CRAN (R 4.0.2)

openxlsx   4.1.5   2020-05-06 [1] CRAN (R 4.0.0)

pander   0.6.3   2018-11-06 [1] CRAN (R 4.0.0)

papaja   * 0.1.0.9997 2020-07-30 [1] Github (crsh/papaja@0457653)

parameters   * 0.8.2   2020-07-24 [1] CRAN (R 4.0.2)

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psych   * 1.9.12.31 2020-01-08 [1] CRAN (R 4.0.2)

purrr   * 0.3.4   2020-04-17 [1] CRAN (R 4.0.0)

R6   2.4.1   2019-11-12 [1] CRAN (R 4.0.0)

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rio   0.5.16   2018-11-26 [1] CRAN (R 4.0.0)

rlang   0.4.7   2020-07-09 [1] CRAN (R 4.0.2)

rmarkdown   2.3   2020-06-18 [1] CRAN (R 4.0.2)

rprojroot   1.3-2   2018-01-03 [1] CRAN (R 4.0.0)

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rstudioapi   0.11   2020-02-07 [1] CRAN (R 4.0.0)

rvest   0.3.6   2020-07-25 [1] CRAN (R 4.0.2)

scales   1.1.1   2020-05-11 [1] CRAN (R 4.0.0)

see   * 0.5.2   2020-07-27 [1] CRAN (R 4.0.2)

selectr   0.4-2   2019-11-20 [1] CRAN (R 4.0.0)

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shape   1.4.4   2018-02-07 [1] CRAN (R 4.0.0)

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sjPlot   * 2.8.4   2020-05-24 [1] CRAN (R 4.0.0)

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testthat   2.3.2   2020-03-02 [1] CRAN (R 4.0.0)

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usethis   1.6.1   2020-04-29 [1] CRAN (R 4.0.0)

vctrs   0.3.2   2020-07-15 [1] CRAN (R 4.0.2)

wesanderson   * 0.3.6   2018-04-20 [1] CRAN (R 4.0.0)

withr   2.2.0   2020-04-20 [1] CRAN (R 4.0.0)

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yaml   2.2.1   2020-02-01 [1] CRAN (R 4.0.0)

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zip   2.0.4   2019-09-01 [1] CRAN (R 4.0.0)

Pilot Study

Pilot Study materials and methods

Sample size: Previous studies concerning the relationship between pathogen threat sensitivity and measures of socially conservative political attitudes report correlations of r = .10-.49 (Md = .24) (Karinen et al., 2019; Terrizzi et al., 2013; Tybur et al., 2016). Corresponding power analyses for sample size estimation indicate that, for α = .05 and a power = .80, the sample size needed is between approximately 30 and 782, with n = 134 corresponding to the median effect size. Because a) the current studies utilize novel measures of pathogen threat avoidance that specifically relate to the COVID-19 outbreak, rather than the disgust sensitivity measures that have primarily been used in previous research, and b) we are interested in differences between participants who identify with different political parties (which necessitates subdividing our sample), within pragmatic constraints of time and available funding, we aimed at the higher end of the broad range of projected sample sizes.

Participants: 522 adult U.S. participants were recruited on Amazon's Mechanical Turk platform in exchange for $ 3.00 (20-minute HIT, accepting workers with a 99% approval rating and at least 500 completed HITS). The payment included a $ 0.25 bonus (included in the $ 3.00 payment) in consideration of exposure to a series of mildly aversive disgust images. Data were prescreened for repeat participation using IP addresses, minimum completeness, minimum completion time, and answers to "catch questions". The final sample consisted of 433 adults (46% female; 76% white) ranging in age from 18-78 (M = 38.4, SD = 11.9). Participants were recruited on April 17th, 2020, when all but 5 US states had stay-at-home or safer-at-home orders ("U.S. state and local government responses to the COVID-19 pandemic", n.d.).

Measures:

Political orientation*:* Political orientation was measured identically to Studies 1 and 2, using the modified version of Dodd et al.'s (2013) version of Wilson and Patterson's (1968) issues index.

Right-wing authoritarianism and social dominance orientation*:* Right-wing authoritarianism and its three subscales–traditionalism, endorsement of authoritarian aggression, and submission to authority–and social dominance orientation were measured as in Studies 1 and 2. The combined socially conservative attitudes scale was again calculated as the z-scored composite between traditionalism and social conservatism. This composite was reliable, $\alpha = .89$.

Precautionary COVID-19 behaviors: Using 7-point Likert scales, the pilot precautionary COVID-19 behaviors scale measure consisted of 10 questions, including the frequency of mask wearing, hand washing, physically distancing, and disinfecting, and the importance to the participant of stocking up on supplies such as hand sanitizer and household disinfectants. Items were rated on 7-point scales, from either "never" to "as often as possible". Or from "not important at all", to "extremely important". Participants were also asked the extent to which they were following local lockdown restrictions. Averaging together participants' responses to these items, we created a composite Pilot Study measure for precautionary COVID-19 behaviors. This composite was reliable, $\alpha = .89$. Note that this composite, while largely similar to the precautionary behaviors composite used in Studies 1 and 2, has slight differences. In the Pilot Study, participants were not asked about the importance of stocking up on masks, the frequency with which supplements were taken with the intention of boosting the immune system, and the extent to which they were careful to maintain distance from people outside the household. Further, in the Pilot Study, participants were asked about how important it was that they stocked up on hand sanitizer and hand soap separately, while in Studies 1 and 2, those two household

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goods were collapsed into a single item. The differences between the Pilot Study, and Studies 1 and 2, can be attributed to scale development refinements that were made after the Pilot Study. In particular, we wanted to broaden the scale to include additional precautions such as the use of supplements, as well as improve how we asked about social distancing, and the importance of mask wearing. Despite these small differences in the precautionary behaviors scale between the Pilot Study, and Studies 1 and 2, there is a substantial degree of actual and conceptual overlap, such that the results of the Pilot Study can be conceptually compared to those of the main text studies.

Other COVID-19-related items: In addition to the precautionary behaviors enumerated above, we asked participants a series of questions concerning other aspects of their beliefs and experiences regarding the COVID19 outbreak. These questions broadly fell into a series of different categories.

First, on a 7-point Likert scale from "not at all protective" to "extremely protective", we asked participants to rate the *effectiveness in protecting against COVID-19* of a variety of different behaviors, such as the use of hydroxychloroquine, handwashing, and mask-wearing.

Second, participants were asked a series of questions that gauged the relative hazards posed by different threats caused by the COVID-19 outbreak. In particular, we measured how participants weighed the perceived threat of the direct health hazards posed by the pandemic relative to the downstream economic costs. Using 1 to 7 Likert type scales, health-domain items included concerns about contracting and transmitting COVID-19, the estimated risk posed by the disease to one's own health as well as the health of those them, as well as questions regarding whether participants thought the threat of the pandemic was overblown, or would quickly pass. Economic

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related items included self-reported anxiety over the financial repercussions of the pandemic, and beliefs that the economic costs of the outbreak outweighed the public health costs. We created a reliable ($\alpha = .82$) *COVID-19 domain-specific threat-assessments* based on these items. Health domain items were reverse scored, such that higher scores indicated finding the direct health consequences of the pandemic less serious, particularly in contrast to downstream threats to the economy. Note that the version of this scale used in the Pilot Study differed substantially from that used in Studies 1 and 2. In the Pilot Study, there were fewer items – and they were less granular – measuring various health concerns; additionally, concerns about personal liberty threats were not measured at all. These changes were made between the Pilot Study and Studies 1 and 2 as refinements in measuring the concepts of interest, and in recognition of the fact that many Americans were expressing grave concerns about personal liberty threats resulting from public health directives. However, despite these differences in the precise items and measures, conceptual comparisons can still be made between the Pilot Study and Studies 1 and 2, if not direct comparisons.

We also asked individual questions (not averaged into any composites) regarding the perceived likelihood of contracting COVID-19, and the severity of the economic consequences resulting from the pandemic.

Third, we asked participants whether they themselves had been infected with COVID-19, and, if so, whether they were still ill.

Fourth, we asked participants questions about *COVID-19 prevalence within their local communities*, including their perceptions of the current local prevalence of COVID-19, their neighborhood's density, and how many people they knew who had contracted COVID-19.

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Fifth, participants provided *political leadership assessments related to the pandemic* using questions, rated on a 1 to 7 Likert scale from "worst possible response" to "best possible response", about the effectiveness of the President, Congress, and the participant's state and local governments in their responses to the outbreak.

Trust in sources of COVID-19 information*:* To examine whether partisan differences in the assessments of the accuracy of different information sources tracked participants' reactions to the COVID-19 outbreak, we asked participants how strongly they trusted politicians, scientists, religious leaders, journalists, alternative news sources, social media, and friends and family in regard to information about the outbreak, rated on a 1-7 Likert scale from, "strongly distrust", to "strongly trust". These trust items were substantially different than those used in Studies 1

and 2. In those studies, participants were provided with a much longer list of sources, and instead of only falling into maximally general categories such as, "scientists" or "politicians", items included specific individuals, organizations, and more narrowly defined groups of people. Additionally, many of the sources used in the main text studies had explicit partisan leanings. Further, instead of asking about "trust" directly, the phrasing in Studies 1 and 2 asked how much participants thought those sources of information provided advice based on accurate information about what to do during the COVID-19 outbreak. These changes were made after the Pilot Study in order to measure trust in a more granular manner, including in terms of partisanship. Therefore, although there is some conceptual comparability between the Pilot and main text studies with these items (for example, the single item "trust in scientists" question in the Pilot Study is broadly comparable to the multi-item composite trust in scientists measure employed in Studies 1 and 2), the main text studies represented a substantial change and improvement over the simpler measures used in the Pilot Study, and comparisons are not always possible.

Disgust Sensitivity: Participants completed the 7-item pathogen subscale of the Three-Domain Disgust Scale (TDDS) (Tybur et al., 2009), and a modified version of Curtis et al.'s (2004) visual disgust sensitivity measure, in counterbalanced order of presentation. The pathogen subscale of the TTDS asks participants to rate how disgusting they find a series of hypothetical scenarios, such as stepping on dog feces or accidentally touching a person's bloody cut. The Curtis et al. image stimuli present participants with a series of 19 images varying in the presence of pathogen cues, such as an open wound or a sickly-looking person; participants rate how disgusting they find each image. Both instruments use a 7-point Likert scale, from "not disgusting at all", to "extremely disgusting". Two disgust sensitivity composites were created by averaging TDDS responses, and the responses to the disgust images, respectively. Because results were conceptually similar whether using the TDDS or disgust images scales, in Studies 1 and 2, only the TDDS was used, in the interest of minimizing survey length.

News consumption: To examine whether media habits were associated with partisan differences in responses to the COVID-19 outbreak, we queried participants about their news consumption. First, we asked participants how many hours they spent per week consuming news of any kind, and we then broke that down into more specific types of news media, asking how many hours per week the participant watched, listened to, or read local newspapers, national newspapers, public radio, local television news, etc. We did not ask questions about specific media outlets, nor did we ask about the partisan leanings of participants' news consumption. This was an omission considering that this work is explicitly interested in whether consumption of different kinds of media sources–particularly in regard to their partisan leanings–may influence politicized differences in COVID-19 reactions. Therefore, in Studies 1 and 2, we added a large battery of more granular items addressing partisan news sources.

Demographics and study checks: Finally, participants answered demographic questions, including their gender identity, ethnicity, age, ZIP code, religious belief, income, education level, and preferred U.S. political party. Note that, out of error, "Independent" was not an option on the political party affiliation question. Check questions included simple attention checks, whether distractions occurred while the participant was taking the survey, a self-report question on whether the participant paid attention during the study, and an English comprehension check that asked participants to write a short sentence or two.

Pilot Study results

Does COVID-19 precautionary behavior differ by political party?

227 participants self-identified as Democrat, 118 self- identified as Republican, and 88 self- identified as either members of the Green party, Libertarian party, Constitutionalist party, or other. Because our recruitment method did not capture large samples of third-party supporters, and because partisan differences between Democrats and Republicans broadly capture wide-ranging variation along different liberalism-conservatism dimensions, we examine party-specific effects only for the two major parties. We find no significant baseline differences in mean precautionary behaviors between Republicans (M = 5.05, SD = 1.31) and Democrats (M = 5.20, SD = 1.17) in our sample (t[215.68] = -1.08, p = .282). These results diverge from those of Studies 1 and 2, where Democrats–on average–engage in significantly more precautions than did Republicans. Note that because "Independent" was accidentally excluded as an option on the political party affiliation question in the Pilot Study, we can only compare between Democrats and Republicans–but not Independents–in this and further analyses.

Do socially conservative political attitudes predict precautionary behavior?

Our composite measure of precautionary behaviors in response to the COVID-19 outbreak was correlated with socially conservative political attitudes among Democrats, but not Republicans (Figure A1.01). Therefore, the prediction made by the traditional norms account—that social conservatism and traditionalism should correlate with pathogen avoidance—is observed, but only among the subset of Democrat participants. This is consistent with the results from Studies 1 and 2.
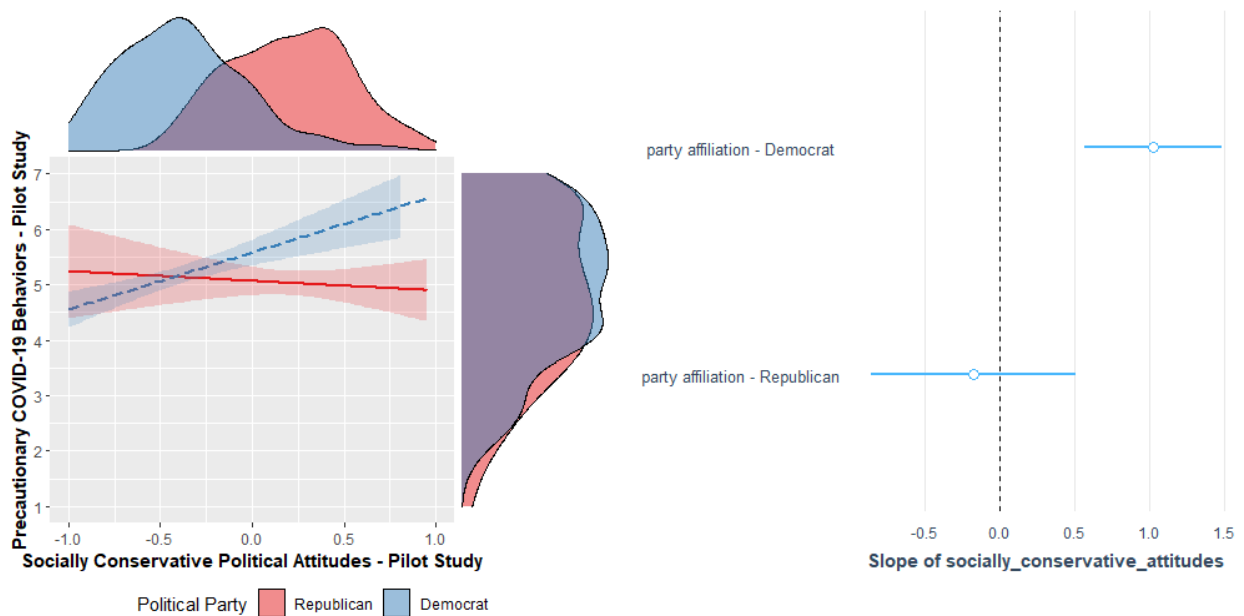
Figure A1.01. Pilot study conditional effects of a moderated linear regression in which COVID-19 precautions were regressed on the (centered) socially conservative attitudes composite, political party affiliation, and their two-way interaction.

The left pane shows the conditional relationships between socially conservative attitudes and COVID-19 precautions by political party affiliation. Bands around regression lines are 95% confidence intervals. The density plot along the x-axis represents the raw distributions of socially conservative attitudes by political affiliation. The density plot along the y-axss represents the raw distributions of precautionary behaviors by political party.

The right pane plots the coefficients obtained from a simple slopes analysis of the effect of socially conservative attitudes for each level of party affiliation. Coefficients are unstandardized. Lines indicate 95% confidence intervals.

What factors drive differences in the relationship between socially conservative political attitudes and precautions between Republicans and Democrats?

In Study 1, we identified four variables that were jointly suppressing the relationship between socially conservative attitudes and precautionary behaviors among Republicans: economic conservatism, the trust in scientists composite, the trust in liberals and moderates composite, and the liberal media consumption composite. In the Pilot Study, we measured economic conservatism, but not any of the trust or media consumption composites. However, there was a single item measuring trust in scientists, which is conceptually related to the composite measure used in the main text analyses. Therefore, as a conceptual if not direct replication, we tested whether economic conservatism and the single trust in scientists item jointly suppressed the relationship between socially conservative attitudes and precautionary behaviors among Republicans.

First, the combined indirect effect of those two variables was negative and significant among Republicans (bootstrapped unstandardized indirect effect = -.50, 95% CI [-.96, -.13]), demonstrating suppression. Second, accounting for the suppressors curtailed the significant moderation of political party on the relationship between socially conservative attitudes and precautionary behaviors, such that there was no longer a significant difference in slopes between Republicans and Democrats ($B = 0.59$, $p = .212$). Third, a simple slopes analysis was performed to ascertain the conditional effects of socially conservative attitudes on precautionary behaviors, accounting for the effects of the suppressors. Socially conservative political attitudes remained a significant positive correlate of precautions among Democrats ($B = 1.04$, $t(327) = 3.89$, $p = 1.23e-4$). However, the conditional effect was not significant among Republicans ($B = 0.45$, $t(327) = 1.17$, $p = .243$).
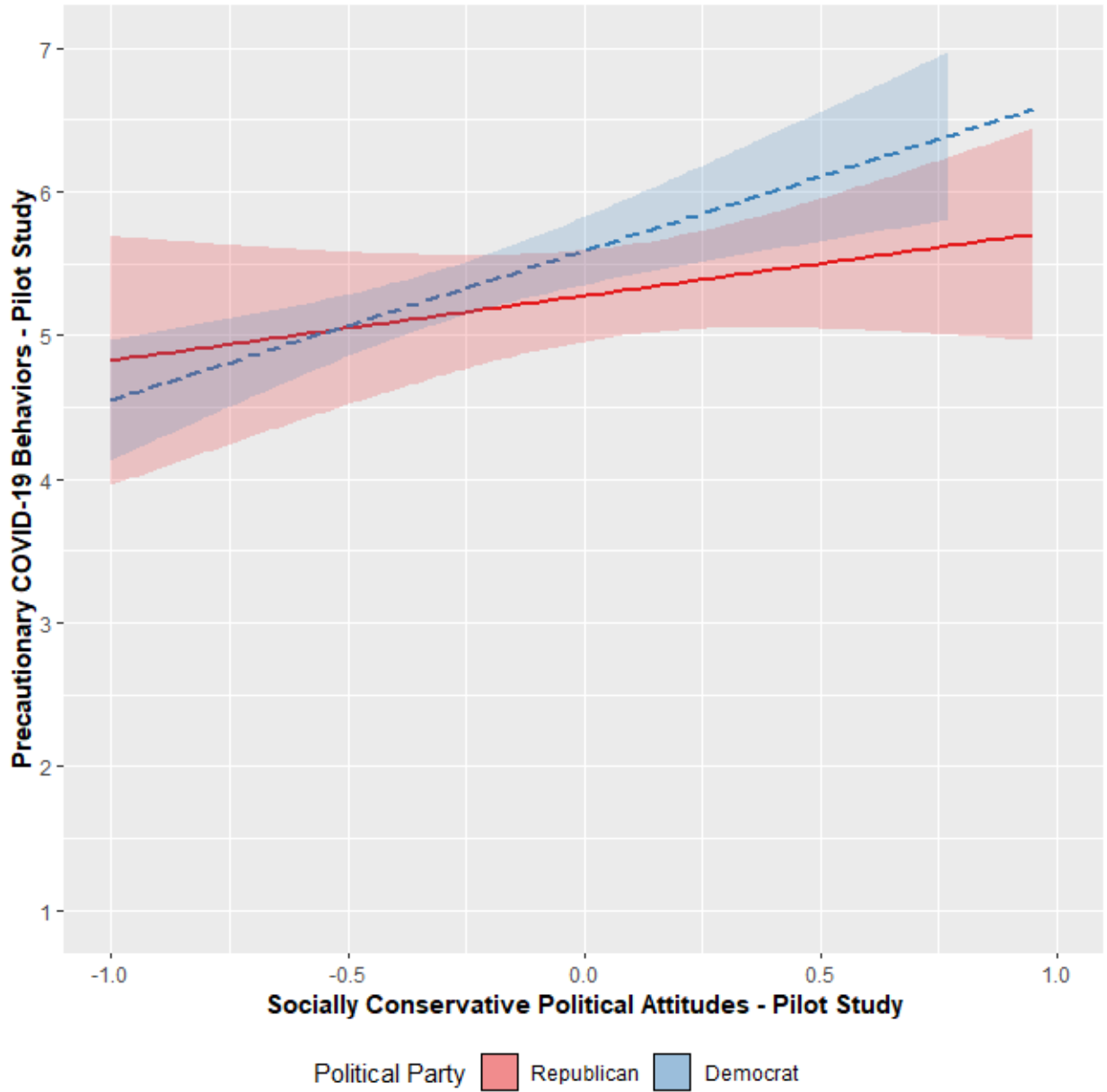
Figure A1.02. Pilot study conditional effects of a moderated linear regression in which the two Pilot Study suppressor variables were added to the model specified in Figure A1.01. Further, each of these suppressor variables interacted with political party affiliation in the model. Bands around regression lines are 95% confidence intervals.

In addition, the party-specific precautions-socially conservative attitudes relationships were conceptually unchanged by adding the full suite of demographic variables and other covariates described in the Main Text.
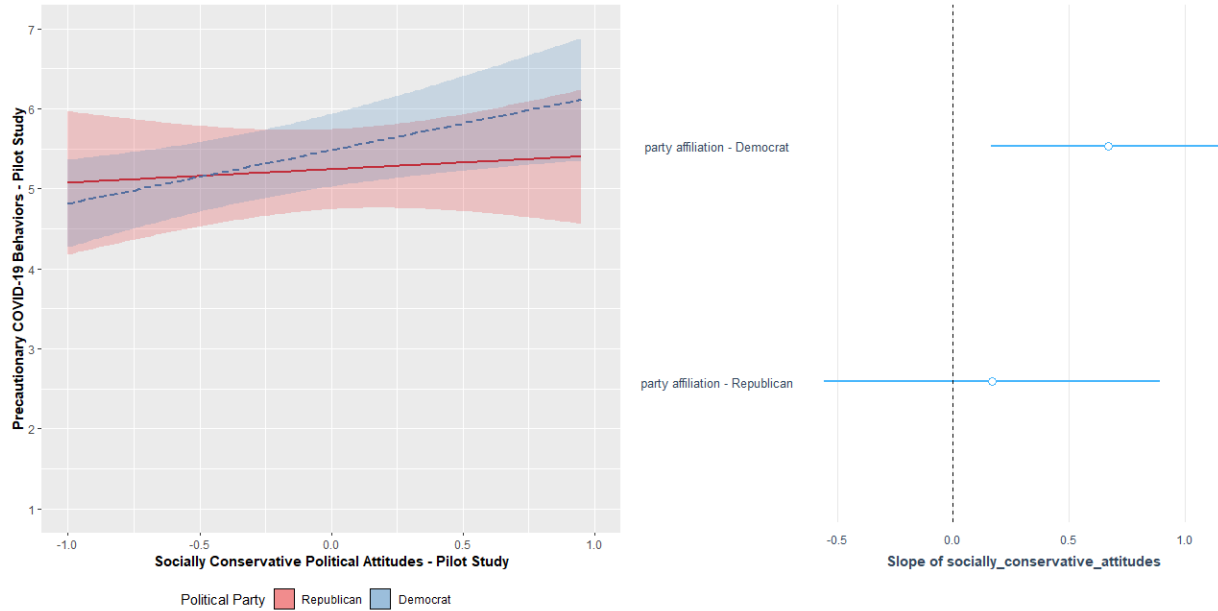
Figure A1.03. Pilot Study conditional effects of a moderated linear regression, in which a wide number of covariates were added to the suppression model specified in Figure A1.02. These additional covariates were as follows: age, gender, ethnicity, income, education, pre-existing health conditions, self-reported density of local neighborhood, self-reported estimates of local COVID-19 prevalence, the extent to which one's job required leaving the household, and the two measures of pathogen disgust sensitivity.

The left pane shows the conditional relationship between socially conservative attitudes and COVID-19 precautions by political party, after accounting for both the effects of the two Pilot Study suppressor variables, as well as the additional covariates. Bands around regression lines are 95% confidence intervals.

The right pane plots the coefficients obtained from a simple slopes analysis of the effect of socially conservative attitudes for each level of party affiliation. Coefficients are unstandardized. Lines indicate 95% confidence intervals.

These findings are largely conceptually consistent with the results from Studies 1 and 2, but with the important caveats that the measured suppressor variables were substantially different between the Pilot Study and the main text studies, and that the conditional effect of socially conservative attitudes on precautionary behaviors did not obtain among Republicans.

Analyses Supporting Main Text

Disgust sensitivity, politics, and precautionary COVID-19 behaviors

Using linear regression with moderation, after accounting for potential interactions between political party affiliation and pathogen disgust sensitivity, both disgust sensitivity composites associated with precautionary behaviors among Democrats (TDDS: $B = .27$, $p = 2.00\text{e-}5$; Disgust images scale: $B = .32$, $p = 1.69\text{e-}6$), and Republicans (TDDS: $B = .40$, $p = 5.48\text{e-}5$; Disgust images scale: $B = .42$, $p = 2.22\text{e-}4$). The interactions between political party and pathogen disgust sensitivity were not significant (Bs $= -.14 - -.10$, ps $= .242 - .456$). These results are consistent with Studies 1 and 2.

Further, both measures of disgust sensitivity associated with socially conservative attitudes among Democrats (see Figure A1.04). However, whereas disgust sensitivity did not associate with socially conservative attitudes among Republicans in either Studies 1 or 2, this association did obtain in the Pilot Study, consistent with prior literature on political differences in pathogen avoidance.
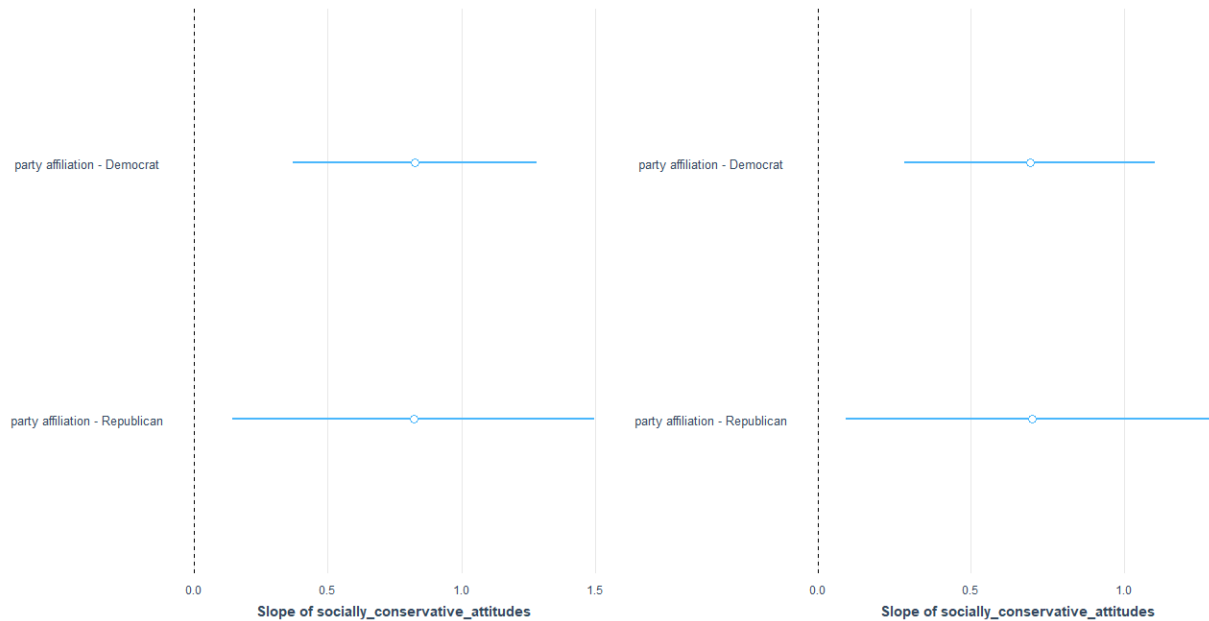
Figure A1.04. Pilot Study forest plots showing conditional effects (based on simple slopes analyses) of moderated linear regressions, in which COVID-19 precautionary behaviors was regressed separately on either pathogen disgust sensitivity measured using the three domain disgust scale (left pane) or pathogen disgust measured using the disgust images scale (right pane), political party affiliation, and the two-way interaction between party affiliation and the particular disgust sensitivity variable. Plotted coefficients are unstandardized. Lines indicate 95% confidence intervals.

Additionally, there was a significant difference in average disgust responses between

Democrats (TDDS: M = 4.69, SD = 1.26; Disgust images scale: M = 4.31, SD = 1.17) and

Republicans (TDDS: M = 4.99, SD = 1.11; Disgust images scale: M = 4.64, SD = .95) along

both pathogen disgust sensitivity scales (TDDS: t[256.52] = 2.31, p = .021; Disgust images

scale: t[281.55] = 2.78, p = .006).

Pilot Study discussion

The overall pattern of findings observed in the Pilot Study are consistent with those

found in Studies 1 and 2. The predicted pattern between socially conservative attitudes and

precautionary COVID-19 behaviors obtained among Democrats, but not Republicans. Further,

among Democrats, socially conservative attitudes were consistently the strongest positive

correlate of precautions, compared to other dimensions of political ideology and attitudes.

Further, although the Pilot Study did not include the trust and media composites found in Studies 1 and 2, thus precluding direct comparison, there was some evidence that economic conservatism and a single-item trust-in-scientists question suppressed the precautions-socially conservative attitudes relationship among Republicans, consistent with the main text studies.

However, it is of some interest that average precautionary behaviors did not significantly differ between Republicans and Democrats in the Pilot Study, contrary to the results from Studies 1 and 2. Although political dynamics have been at play since the start of the COVID-19 outbreak, political polarization concerning responses to the pandemic have increased over time (Pew Research Center, 2020), including in the intervening periods between the Pilot Study and Studies 1 and 2. We speculate that our results may reflect a canalization of a partisan difference in precautions over time, such that gaps in prophylaxis widened between supporters of different political affiliations. Alternatively, the null results in the Pilot Study may reflect a false negative.

Two critical limitations of the Pilot Study were the small number of Republicans in the sample, and the lack of an Independent option on the political affiliation question. If Independents, on average, occupy an ideological middle ground between Republicans and Democrats, this omission constituted a substantial missed opportunity to examine the relationship between precautionary behavior and political attitudes. In Studies 1 and 2, we addressed these limitations by increasing the overall recruitment target–hence increasing the number of Republicans in the samples– and adding "Independent" as a political party option. Additionally, although we were interested in how partisan differences in trust and news consumption choices might shape responses to the COVID-19 outbreak–particularly in regard to their potential suppressive effects on the precautions-socially conservative attitudes relationship– in the Pilot Study we failed to measure participants' trust for information sources aligned or

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misaligned with their political ideologies. Instead, we asked questions about, for instance, whether they trusted journalists in general, rather than journalists with specific partisan perspectives. Likewise, we did not ask about consumption of any particular news outlets, or outlets that varied in their partisanship (e.g., Fox News, MSNBC). To address these issues in Studies 1 and 2, we used more granular trust and media consumption items that considered the partisanship of the various sources, and differences between individual actors and larger institutions, and also attended more to issues regarding trust in different kinds of scientific sources.

Further, in the Pilot Study we failed to adequately measure attitudes toward non-health threats posed by the COVID-19 outbreak, such as those posed by economic crisis or the perceived loss of personal liberties. Given our interest in examining trade-offs in concern and precautions for different domains of threat related to the pandemic, it was important to measure estimates of those non-health threats in more detail. Although the Pilot Study included several measures addressing perceived economic risks, we did not systematically gauge either risk assessments or precautionary behaviors in response to the non-health consequences of the COVID-19 outbreak. Therefore, in Studies 1 and 2, we posed a systematic set of questions along these lines, such as participants' degree of concern about losing individual liberties, and whether participants were preparing for an economic downturn.

Finally, in light of the preliminary results from the Pilot Study, we considered the possibility that dynamics concerning perceived government overreach vis-a-vis the coronavirus outbreak may be associated with preferences for individual liberties and small government, as indexed by economic conservatism. These kinds of attitudes may shape politicized responses to the pandemic. To further probe this possibility in Studies 1 and 2, we included a short, face-valid

scale that measured opinions about government public health policy in relation to smoking. This allowed a more direct measure of attitudes concerning another real-world public health intervention, affording a test of the possibility that skepticism of public health mandates in a general sense might play a role in the interaction between socially conservative attitudes, political party, and precautionary behaviors.

Analyses Supporting Main Text

1. **Exploratory factor analysis of trust variables**

In Study 1, we included items that measured participants' confidence in a wide range of different sources of information concerning COVID-19. We ran an exploratory factor analysis in order to determine the factor structure of these items, which included media figures, media organizations, health professionals, health organizations, politicians, and broad categories of people; these categories spanned the ideological spectrum. First, we used the Kaiser-Meyer-Olkin (KMO) and Bartlett's tests to determine whether these items were suitable for structure detection. The KMO test suggested that the strength of the relationships among the variables was high (KMO = .94), and Bartlett's test was significant ($\chi^2(276) = 20015.04$, $p < .001$), suggesting that the use of factor analysis was appropriate.

The R package parameters (Lüdecke, Ben-Shachar & Makowski, 2020). was then used to determine how many factors to extract. There was the most agreement between methods for a three factor solution.

How many factors to retain
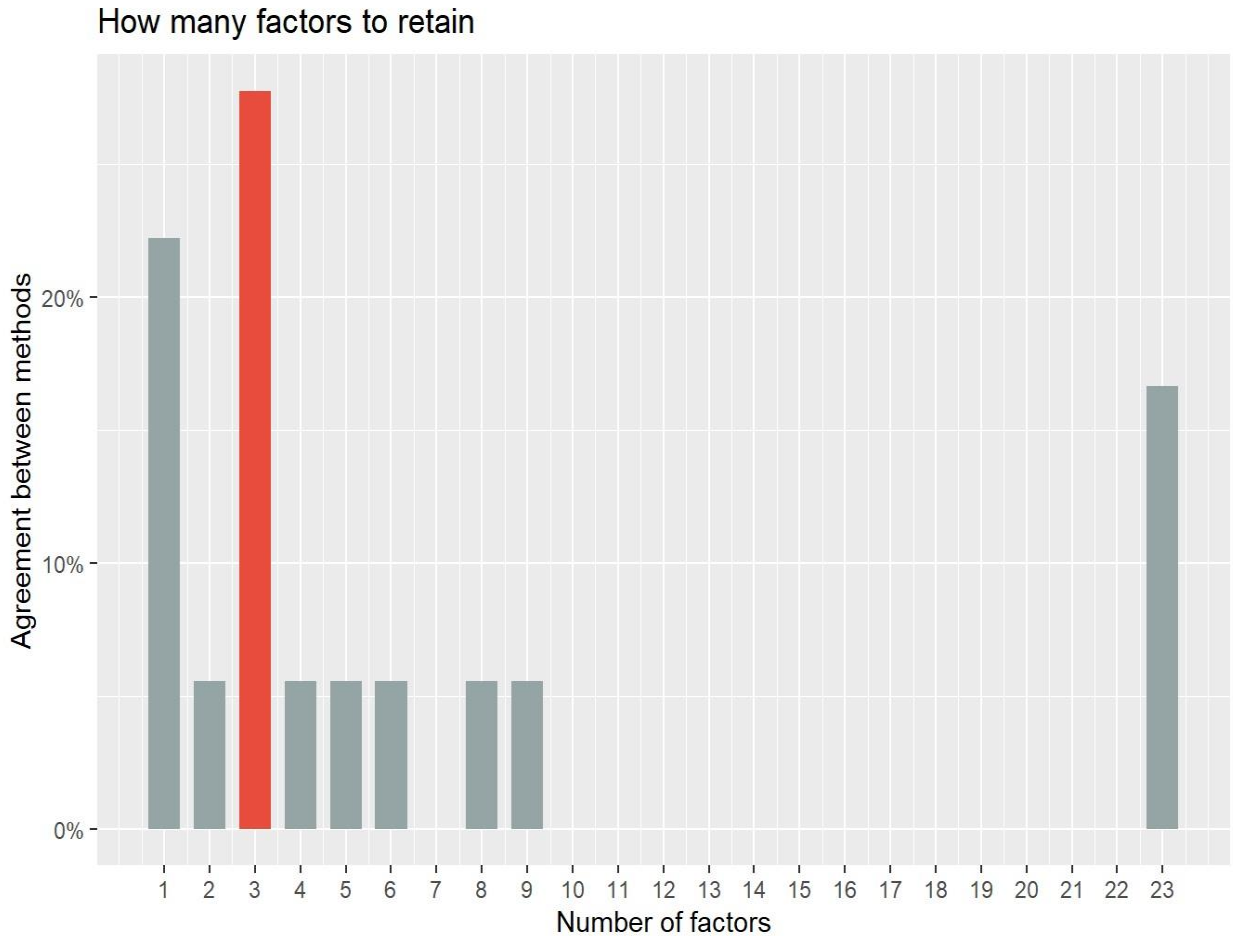
Figure A1.05. Graphical representation showing agreement between different methods for determining the number of factors to retain.

A factor analysis was conducted with minimum residual extraction, oblimin rotation, and a polychoric correlation matrix. Three factors were extracted. The three factor values had sums of squared loadings of 6.83, 5.98, and 3.68, and explained 30%, 26%, and 16% of the variance, respectively. When extracted, these three factors were conceptually coherent (see Table A1.04). For each factor, items with factor loadings greater than .60 were averaged together, producing the composite measures used in analyses. We labeled these factors, "trust in liberals and moderates", "trust in conservatives", and "trust in scientists".

```
## Standardized loadings (pattern matrix) based upon correlation matrix
##                                    MR1   MR2   MR3   h2    u2    com
## covid_accuracy_liberaljournalists     0.78 -0.23  0.08 0.78 0.219 1.2
## covid_accuracy_fauci                  0.17 -0.15  0.71 0.74 0.259 1.2
## covid_accuracy_trump                 -0.19  0.85 -0.01 0.79 0.214 1.1
## covid_accuracy_cdc                   -0.05  0.07  0.84 0.64 0.363 1.0
## covid_accuracy_msnbc                  0.79 -0.12  0.15 0.80 0.196 1.1
## covid_accuracy_fox                    0.02  0.90  0.05 0.80 0.201 1.0
## covid_accuracy_breitbart              0.15  0.85 -0.15 0.77 0.229 1.1
## covid_accuracy_hannity               -0.02  0.95  0.02 0.91 0.091 1.0
## covid_accuracy_carlson               -0.04  0.91 -0.02 0.84 0.161 1.0
## covid_accuracy_limbaugh              -0.01  0.93 -0.02 0.88 0.121 1.0
## covid_accuracy_nytimes                0.65 -0.16  0.29 0.77 0.233 1.5
## covid_accuracy_cnn                    0.71 -0.12  0.21 0.75 0.254 1.2
## covid_accuracy_healthproviders       -0.01  0.08  0.82 0.65 0.351 1.0
## covid_accuracy_stategov               0.24  0.12  0.45 0.36 0.636 1.7
## covid_accuracy_wallstreetjournal      0.49  0.15  0.35 0.53 0.474 2.0
## covid_accuracy_usatoday               0.63  0.17  0.30 0.67 0.331 1.6
## covid_accuracy_medicalscientists      0.04 -0.10  0.80 0.72 0.283 1.0
## covid_accuracy_conservativejournalists 0.08 0.89  0.11 0.76 0.235 1.0
## covid_accuracy_centristjournalists    0.61  0.19  0.13 0.48 0.524 1.3
## covid_accuracy_youngturks             0.73  0.13 -0.08 0.49 0.514 1.1
## covid_accuracy_hayes                  0.94  0.10 -0.14 0.76 0.241 1.1
## covid_accuracy_maddow                 0.87 -0.18  0.02 0.85 0.154 1.1
## covid_accuracy_odonnell               0.93  0.14 -0.10 0.78 0.220 1.1
## 
##                       MR1  MR2  MR3
## SS loadings          6.83 5.98 3.68
## Proportion Var       0.30 0.26 0.16
## Cumulative Var       0.30 0.56 0.72
## Proportion Explained 0.41 0.36 0.22
## Cumulative Proportion 0.41 0.78 1.00
## 
##  With factor correlations of
##      MR1   MR2   MR3
## MR1 1.00 -0.08  0.54
## MR2 -0.08 1.00 -0.21
## MR3 0.54 -0.21  1.00
```

Table A1.01. Output of factor analysis on trust items.

2.   **Party-specific relationships between COVID-19 precautions and ideological measures**

Given our primary hypotheses regarding putative relationships between socially conservative attitudes and pathogen avoidance, in the main text we focus on the relationships between COVID-19 precautions and socially conservative attitudes. However, we also measured additional dimensions of political ideology, including economic and militaristic conservatism, as well as social dominance orientation and the other two subscales of right-wing authoritarianism, submission to authority, and endorsement of authoritarian aggression. Here, we visualize the zero-order correlations between those additional dimensions of political belief and precautionary COVID-19 behaviors in Studies 1 and 2. Of particular interest, economic conservatism negatively correlated with precautions among Republicans and Independents, yet positively correlated with precautions among Democrats. Further, social dominance orientation negatively associated with precaution among Republicans and Independents in Study 1, and among supporters of all three affiliations in Study 2.
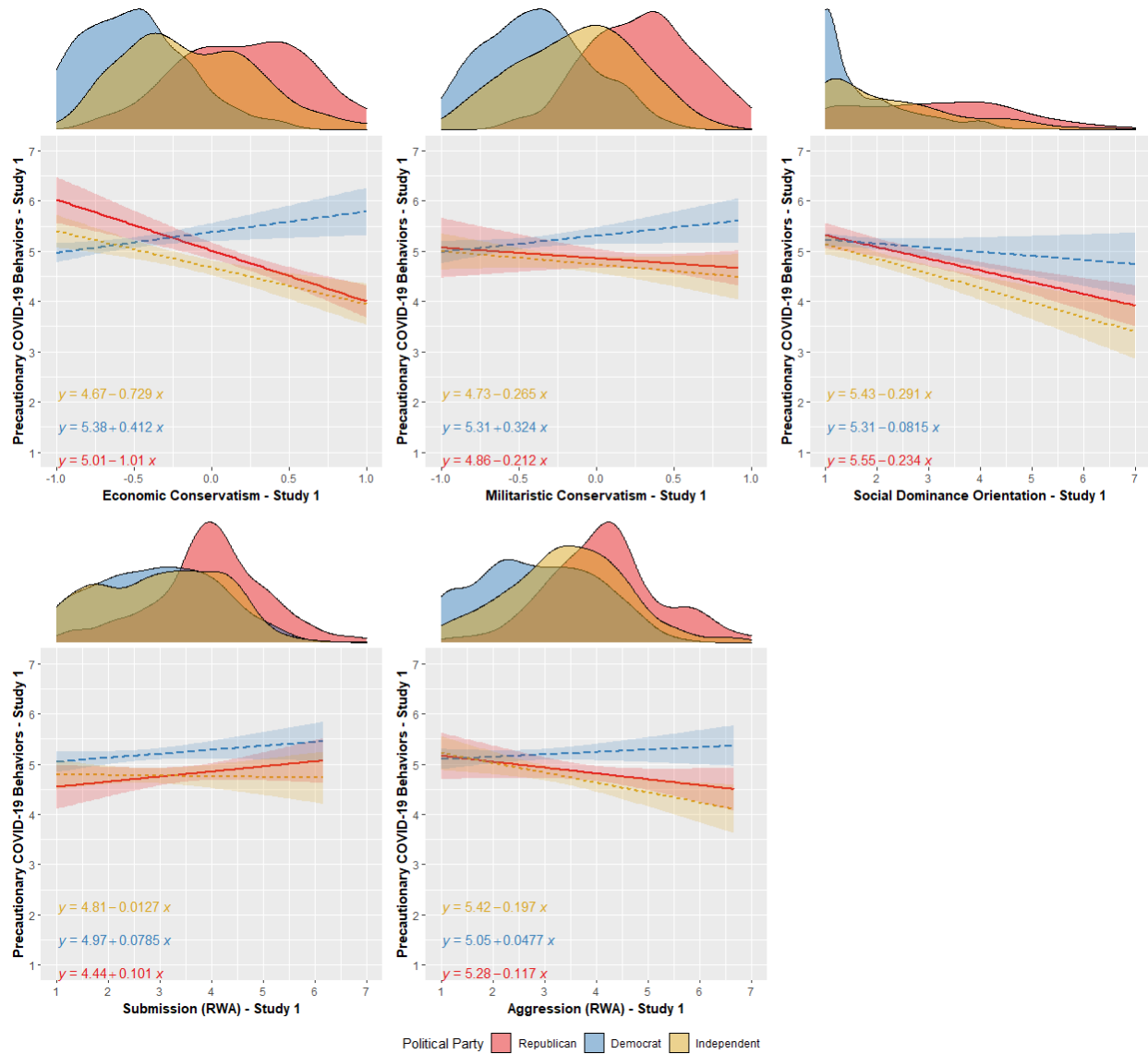
Figure A1.06. Study 1 conditional effects of moderated linear regressions in which COVID-19 precautions were separately regressed on each individual (centered) political ideology measure, political party affiliation, and the two-way interaction between party affiliation and the particular ideology measure. Bands around regression lines are 95% confidence intervals. The density plots along the x-axes represent the raw distributions of the ideology measures by political affiliation. On each plot, regression equations indicate the conditional simple slopes relationships between

ideological measures and COVID-19 precautions by political affiliation (slopes are unstandardized).
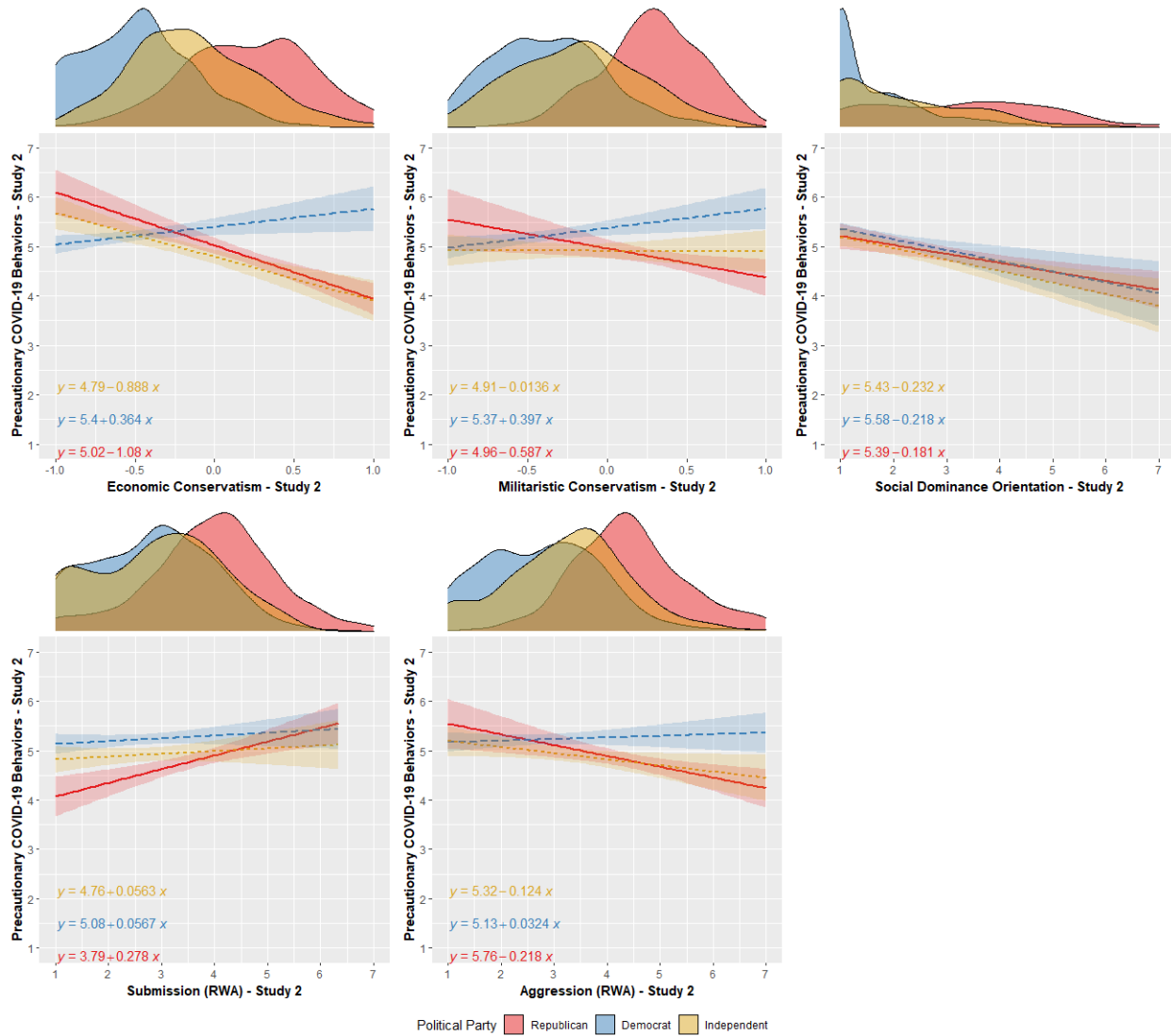
Figure A1.07. Study 2 conditional effects of moderated linear regressions in which COVID-19 precautions were separately regressed on each individual (centered) political ideology measure, political party affiliation, and the two-way interaction between party affiliation and the particular ideology measure. Bands around regression lines are 95% confidence intervals. The density plots along the x-axes represent the raw distributions of the ideology measures by political affiliation. On each plot, regression equations indicate the conditional relationships between ideological measures and COVID-19 precautions by political affiliation.

3. Testing for suppressors of the precautions-socially conservative attitudes relationship

In Study 1, we considered a large number of potential suppressor variables (see Table A1.02 for list of variables) that may shape partisan differences in precautionary COVID-19 behaviors. In the main text, we indicate that in Study 1 we then conducted an exploratory, bottom-up analysis to identify whether any of those theoretically-motivated variables were suppressing the relationship between socially conservative attitudes and precautionary behaviors among Republicans. To identify possible suppressors, we tested whether each target variable inconsistently mediated the relationship between socially conservative attitudes and precautionary behaviors among Republicans. That is, in order to be considered a suppressor, the target variable has to result in a significant and negative indirect effect between socially conservative attitudes and precautionary behaviors. The table below reports the results of exhaustive testing of the candidate Study 1 variables for possible suppression. Because Study 2 was a confirmatory replication, the exploratory suppressor-identification process was not used, and instead suppression was tested for using only the variables previously identified in Study 1 (see Main Text for results of suppressor models in Study 2).

Suppressor	Bootstrapped unstandardized indirect effect	Lower unstandardized bootstrapped 95% CI	Upper unstandardized bootstrapped 95% CI	Bootstrapped standardized indirect effect	Lower standardized bootstrapped 95% CI	Upper standardized bootstrapped 95% CI
Economic conservatism composite	-0.13	-0.20	-0.08	-0.15	-0.21	-0.09
Militaristic conservatism composite	-0.01	-0.05	0.02	-0.02	-0.06	0.02
Social dominance orientation composite	-0.04	-0.09	0.00	-0.04	-0.09	0.00
Submission to authority composite	0.01	-0.01	0.05	0.02	-0.01	0.05
Endorsement of authoritarian aggression composite	-0.01	-0.04	0.00	-0.02	-0.05	0.01
Perceived effectiveness of handwashing	0.04	-0.02	0.10	0.05	-0.02	0.11
Perceived effectiveness of mask wearing	-0.05	-0.13	0.04	-0.06	-0.15	0.03
Perceived effectiveness of hydroxychloroquine	0.02	0.00	0.05	0.02	-0.01	0.05
Perceived effectiveness of social distancing	-0.02	-0.10	0.06	-0.02	-0.10	0.06
Perceived effectiveness of disinfecting surfaces	0.00	-0.08	0.09	0.00	-0.09	0.09

Perceived effectiveness of immune system supplements	0.02	-0.03	0.07	0.02	-0.03	0.08
Perceived effectiveness of silver solution	0.01	-0.02	0.04	0.01	-0.02	0.04
Perceived prevalence of COVID-19 in local community	-0.03	-0.09	0.03	-0.03	-0.09	0.03
Perceived population density of local community	-0.04	-0.09	0.00	-0.04	-0.09	0.00
Age	-0.02	-0.04	0.00	-0.02	-0.05	0.00
Trust in liberals and moderates composite	-0.06	-0.12	-0.02	-0.07	-0.12	-0.03
Trust in scientists composite	-0.06	-0.11	-0.01	-0.06	-0.12	-0.01
Trust in conservatives composite	0.03	-0.01	0.07	0.03	-0.01	0.08
Conservative media consumption	0.02	0.00	0.04	0.02	0.00	0.05
Liberal media consumption	-0.06	-0.10	-0.03	-0.06	-0.11	-0.03
Total news consumption across any source	0.00	-0.03	0.02	0.00	-0.03	0.02
Precautionary economic behaviors	0.03	-0.01	0.09	0.03	-0.02	0.09

Concern over medical care access because of COVID-19	0.00	-0.04	0.04	0.00	-0.04	0.04
COVID-19 domain-specific threat assessment composite	-0.04	-0.11	0.02	-0.05	-0.12	0.02
Engage in COVID19 precautions out of concern for own health	-0.04	-0.10	0.00	-0.05	-0.10	0.00
Engage in COVID19 precautions out of concern for others' health	0.04	-0.01	0.10	0.05	-0.01	0.11
Perceived likelihood of contracting COVID-19 oneself	0.01	-0.04	0.06	0.01	-0.04	0.06
Perceived likelihood of family member contracting COVID-19	0.00	-0.04	0.03	0.00	-0.04	0.03
Perceived likelihood of someone in one's community contracting COVID-19	-0.02	-0.07	0.03	-0.02	-0.08	0.02

Perceived severity of economic consequences one faces	-0.01	-0.04	0.01	-0.02	-0.05	0.01
Perceived effectiveness of president's response to COVID-19	0.01	-0.02	0.05	0.01	-0.02	0.05
Perceived effectiveness of congress' response to COVID-19	0.00	-0.03	0.03	0.00	-0.04	0.03
Perceived effectiveness of one's state and local governments' response to COVID-19	0.00	-0.03	0.04	0.00	-0.03	0.04
Income	0.00	-0.01	0.02	0.00	-0.01	0.03
Government public health intervention opinions composite	0.00	-0.04	0.03	0.00	-0.04	0.04

Table A1.02. Summary of suppression identification process. All candidate variables were tested for a negative and significant indirect effect between socially conservative attitudes and precautionary COVID-19 behaviors, which would indicate suppression. Four variables had a significant negative indirect effect: economic conservatism, trust in scientists, trust in liberals and moderates, and liberal news media consumption. Estimates of the indirect effects and 95% confidence intervals are taken from averages of 5,000 bootstrapped iterations.

Based on the table above, four variables had significant suppressive effects: economic conservatism, the trust in scientists composite, the trust in liberals and moderates composite, and the liberal media composite. Economic conservatism was the strongest suppressor.

In Figure 1.02 in Chapter 1, we then assessed the party-specific relationships between the four suppressor variables and COVID-19 precautions, in order to understand how these suppressor variables resulted in significant indirect effects between socially conservative attitudes and precautions. Additionally, we aimed to test the possibility that these identified suppressors may interact with political party affiliation in correlating with COVID-19 precautions. For example, economic conservatism positively associated with precautions among Democrats, but was negatively correlated with precautions among Republicans and Independents (see Figure A1.06). If the effects of the suppressors on precautionary behaviors was dependent on party affiliation, then it would be important to include those interactions in the joint suppression model.

In the Main Text, we report that political party was a significant moderator of all four suppressor variables in their relationships with COVID-19 precautions. The statistics for these interactions are reported in Table A1.03. Further, in the Main Text, we used the results of simple slopes analyses individually regressing COVID-19 precautions on the four suppressor variables and their interactions with political party to claim that greater trust in scientists, trust in liberals and moderates, and liberal media consumption were all positively correlated with COVID-19 precautions among Republicans and Independents in both studies. Further, economic conservatism was negatively associated with COVID-19 precautions among Republicans and Independents in both studies. Among Democrats, there was a positive correlation in Study 2 but not Study 1 between trust in scientists and precautions, no correlation between precautions and trust in liberals and moderates in either study, and a positive correlation between precautions and both liberal media consumption and economic conservatism in both studies. The statistics for these simple slopes are reported in Table A1.04.

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Interaction effects	PRECAUTIONARY COVID-19 BEHAVIORS, STUDY 1				PRECAUTIONARY COVID-19 BEHAVIORS STUDY 2			
	B	SE	t value	p	B	SE	t value	p
Trust in scientists, Democrats-Republicans	.28	.08	3.62	<.001	.25	.08	3.24	.001
Trust in scientists, Democrats-Independents	.14	.07	1.85	.065	.15	.08	1.99	.047
Trust in scientists, Republicans-Independents	-.14	.08	-1.81	.071	-.10	.07	-1.36	.175
Trust in liberal and moderate sources, Democrats-Republicans	.23	.07	3.53	<.001	.33	.06	5.19	< .001
Trust in liberal and moderate sources, Democrats-Independents	.12	.07	1.77	.077	.15	.06	2.58	.010
Trust in liberal and moderate sources, Republicans-Independents	-.12	.07	-1.67	.095	-.18	.07	-2.68	.008
Liberal media consumption, Democrats-Republicans	.17	.09	1.92	.056	.25	.08	3.25	.001
Liberal media consumption, Democrats-Independents	.18	.09	2.04	.042	.23	.09	2.63	.009
Liberal media consumption, Republicans-Independents	.01	.11	.10	.924	-.02	.10	-.23	.820

Economic conservatism, Democrats-Republicans	-1.42	.24	-5.89	<.001	-1.44	.24	-6.07	<.001
Economic conservatism, Democrats-Independents	-1.14	.23	-4.87	<.001	-1.25	.23	-5.39	<.001
Economic conservatism, Republicans-Independents	.28	.25	1.13	.261	.19	.25	.76	.448

Table A1.03. COVID-19 precautions were individually regressed on the interaction between each of the four suppressor variables and political party affiliation. This table summarizes the statistics of the interaction between each political party affiliation comparison, and each of the four suppressor variables. Political party affiliation significantly moderated the effect of each of the suppressor variables on COVID-19 precautions in both studies.

Simple slopes	PRECAUTIONARY COVID-19 BEHAVIORS, STUDY 1				PRECAUTIONARY COVID-19 BEHAVIORS STUDY 2			
	B	*SE*	*t value*	*p*	*B*	*SE*	*t value*	*p*
Trust in scientists— Democrats	.04	.05	.78	.437	.17	.06	2.86	.004
Trust in scientists— Republicans	.32	.05	5.79	<.001	.42	.05	8.21	<.001
Trust in scientists— Independents	.18	.05	3.39	.001	.32	.05	6.34	<.001
Trust in liberals and moderates— Democrats	.02	.04	.47	.635	.01	.04	.30	.767
Trust in liberals and moderates —Republicans	.26	.05	5.09	<.001	.34	.05	6.87	<.001
Trust in liberals and moderates —Independents	.14	.05	2.77	.006	.17	.04	.3.74	<.001
Liberal media consumption— Democrats	.21	.05	4.38	<.001	.19	.05	4.10	<.001
Liberal media consumption — Republicans	.38	.08	5.04	<.001	.44	.06	7.04	<.001
Liberal media consumption — Independents	.39	.07	5.21	<.001	.42	.08	5.62	<.001
Economic conservatism— Democrats	.41	.16	2.61	.009	.36	.15	2.39	.017

Economic conservatism —Republicans	-1.01	.18	-5.53	<.001	-1.08	.18	-5.91	<.001
Economic conservatism —Independents	-1.01	.18	-4.22	<.001	-.89	.18	-5.05	<.001

Table A1.04. COVID-19 precautions were individually regressed on the interaction between each of the four suppressor variables and political party affiliation. This table reports the simple slopes relationships between each of the suppressor variables and COVID-19 precautions for each level of political party affiliation.

Finally, in order to understand how each suppressor variable resulted in a negative indirect effect between socially conservative attitudes and COVID-19 precautions, we individually regressed each suppressor variable on socially conservative attitudes and its interaction with political party. In the Main Text, of the four suppressor variables, we claimed that socially conservative attitudes negatively correlated with trust in scientists, and trust in liberals and moderates among Republicans and Independents in both studies, but positively correlated with economic conservatism. Further, socially conservative attitudes negatively correlated with liberal media consumption among Republicans in both studies, but among Independents, this significant correlation only obtained in Study 2. We plot the conditional effects of socially conservative attitudes by political party on each suppressor variable in Figure A1.08, and report the results of simple slopes analyses in Table A1.05.
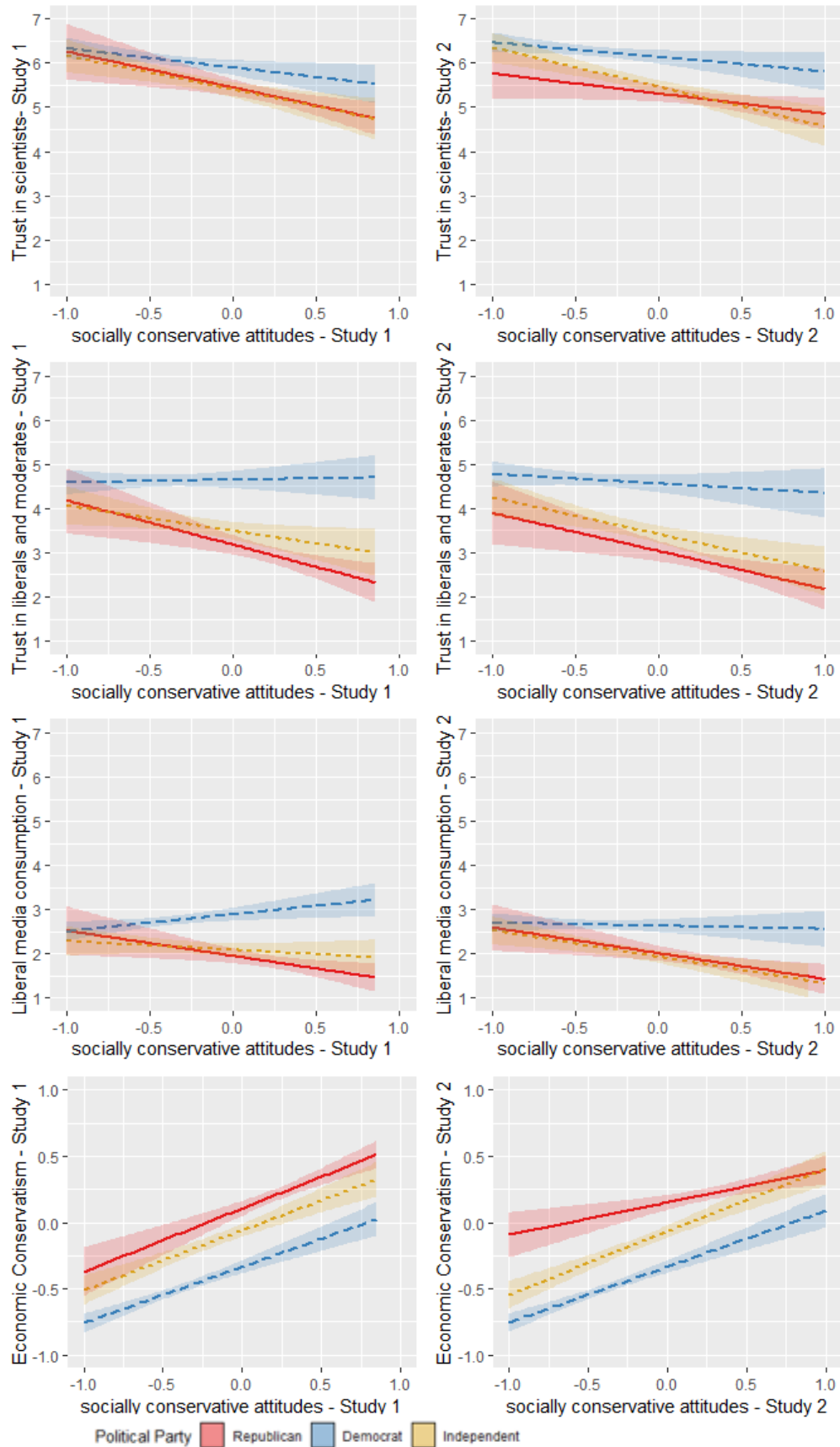
Figure A1.08. Studies 1 and 2 condition effects of moderated linear regressions in which each of the four suppressor variables were separately regressed on socially conservative attitudes, political party affiliation, and their two-way interaction. Bands around regression lines are 95% confidence intervals.

Simple slopes	TRUST IN SCIENTISTS, STUDY 1				TRUST IN SCIENTISTS, STUDY 2			
	B	*SE*	*t value*	*p*	*B*	*SE*	*t value*	*p*
Socially conservative attitudes— Democrats	-.43	.17	-2.51	.012	-.33	.16	-2.12	.035
Socially conservative attitudes — Republicans	-.81	.26	-3.11	.002	-.45	.22	-2.03	.042
Socially conservative attitudes — Independents	-.77	.21	-3.61	<.001	-.90	.19	-4.80	<.001
	TRUST IN LIBERAL AND MODERATE SOURCES, STUDY 1				TRUST IN LIBERAL AND MODERATE SOURCES , STUDY 2			
Socially conservative attitudes— Democrats	.06	.20	.29	.770	-.22	.20	-1.07	.284
Socially conservative attitudes — Republicans	-1.00	.31	-3.28	.001	-.86	.28	-3.05	.002
Socially conservative attitudes — Independents	.-57	.25	-2.32	.021	-.84	.23	-3.59	<.001
	LIBERAL MEDIA CONSUMPTION, STUDY 1				LIBERAL MEDIA CONSUMPTION , STUDY 2			
Socially conservative attitudes— Democrats	.39	.15	2.55	.011	-.07	.15	-.48	.631
Socially conservative attitudes — Republicans	-.57	.23	-2.54	.011	-.59	.21	-2.80	.005

Socially conservative attitudes — Independents	-.20	.19	-1.08	.282	-.60	.17	-3.48	.001
	ECONOMIC CONSERVATISM, STUDY 1				**ECONOMIC CONSERVATISM, STUDY 2**			
Socially conservative attitudes— Democrats	.42	.05	8.38	<.001	.42	.05	9.02	<.001
Socially conservative attitudes — Republicans	.48	.08	6.37	<.001	.25	.07	3.65	<.001
Socially conservative attitudes — Independents	.45	.06	7.36	<.001	.48	.06	8.62	<.001

Table A1.05. Each suppressor variable was individually regressed on the interaction between socially conservative attitudes and political party affiliation. This table reports the simple slopes relationships between socially conservative attitudes and each of the suppressor variables for each level of political party affiliation.

4. **Correlations between political measures**

In the main text, we note that the political ideology and attitude measures were all highly correlated with each other. The following figures display those relationships for Studies 1 and 2.

Figure A1.09. Correlations between political measures in Study 1. In this correlation matrix, square size and square color in the upper right triangle corresponds with the size of the correlation, displayed numerically in the lower left triangle.

Figure A1.10. Correlations between political measures in Study 2. In this correlation matrix, square size and square color in the upper right triangle corresponds with the size of the correlation, displayed numerically in the lower left triangle.

5.   **Robustness of results after including covariates**

In the main text, we claimed that the party-specific relationships--after accounting for the effects of the suppressor variables--between COVID-19 precautions and socially conservative

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attitudes were largely robust to the inclusion of basic demographic variables, COVID-19-related covariates (see Figure *A1.09* for list of covariates), and pathogen disgust sensitivity. Here, we plot the party-specific relationships between COVID-19 precautions and socially conservative attitudes, and report results of a simple slopes analysis by party affiliation.
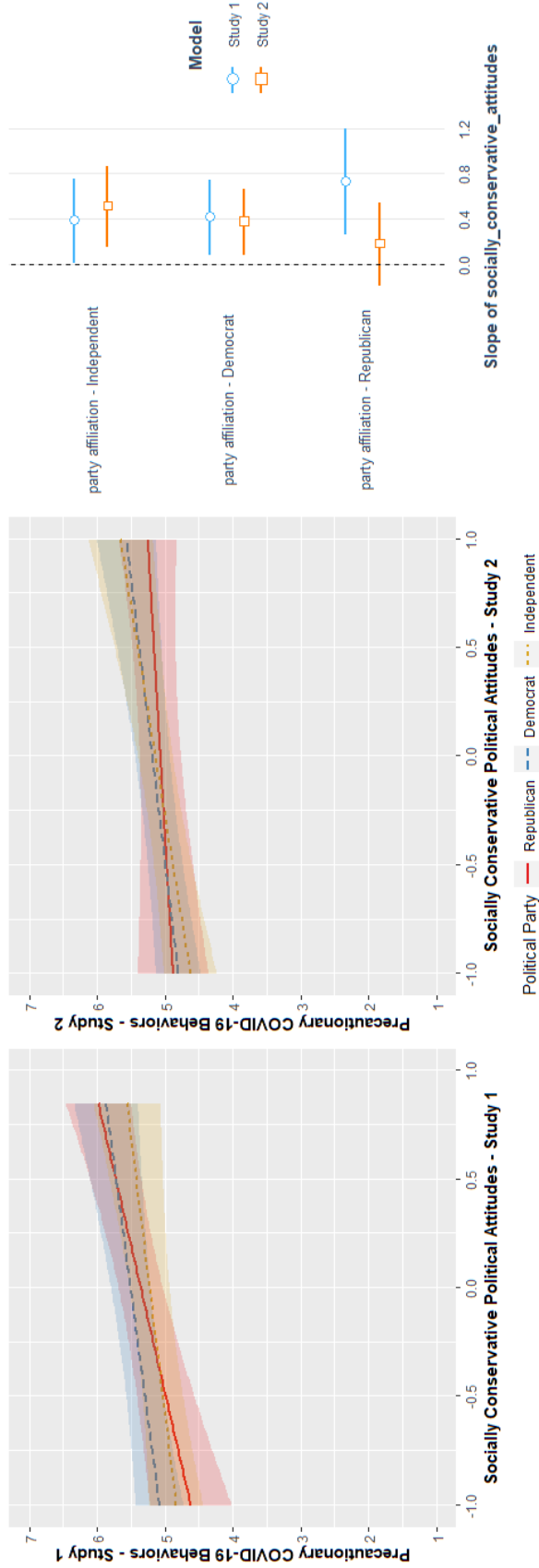
Figure A1.11. Studies 1 and 2 conditional effects of moderated linear regressions, in which a wide number of covariates were added to the suppression models specified in Figure 2 (see Main Text). These additional covariates were as follows: age, gender, ethnicity, income, education, pre-existing health conditions, self-reported density of local neighborhood, self-reported estimates of local COVID-19 prevalence, the extent to which one's job required leaving the household, and pathogen disgust sensitivity.

The left-two panes show the conditional relationships between socially conservative attitudes and COVID-19 precautions by political party, after accounting for both the effects of the previously-identified suppressor variables, as well as the additional covariates. Bands around regression lines are 95% confidence intervals.

The right-most pane plots the coefficients obtained from simple slopes analyses of the effect of socially conservative attitudes for each level of party affiliation across both studies. Coefficients are unstandardized. Lines indicate 95% confidence intervals. After accounting for the additional covariates, the positive correlations between socially conservative attitudes and COVID-19 precautions remained significant among Democrats and Independents in both studies. Among Republicans, the relationship only obtained in Study 1, and not Study 2.

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6. **Are the relationships between socially conservative attitudes and COVID-19 precautions attributable to other dimensions of political ideology?**

In the Main Text, we claimed that including additional measures of political ideology—such as authoritarian aggression, submission to authority, social dominance orientation, economic conservatism, and militaristic conservatism—largely did not account for the party-specific correlations between socially conservative attitudes and precautionary COVID-19 behaviors. Further, we also claimed that socially conservative attitudes were the strongest positive ideological correlates of COVID-19 precautions among supporters of all three major party affiliations in Study 1, and among Democrats and Independents in Study 2. Below, we describe and present the results of the moderated linear regressions that were used to make these claims.

	precautionary COVID-19 behaviors, Study 1				precautionary COVID-19 behaviors Study 2			
Conditional effects	*B*	*SE*	*t value*	*p*	*B*	*SE*	*t value*	*p*
Socially conservative attitudes - Democrats	0.96		0.21 4.66	**<0.001**	0.81	0.19	4.28	**<0.001**
Socially conservative attitudes - Republicans	0.66		0.25 2.61	**0.009**	0.24	0.21	1.16	.246
Socially conservative attitudes - Independents	0.73		0.23 3.21	**0.001**	0.71	0.23	3.14	**0.002**
SDO - Democrats	-0.15	0.07	-2.27	**0.024**	-.30	0.06	-4.68	**<0.001**

	B	SE	t	p	B	SE	t	p
SDO - Republicans	-0.16	0.06	-2.94	**0.003**	-.01	0.5	-.20	.841
SDO - Independents	-0.17	0.07	-2.59	**0.010**	-.03	.07	-.37	.709
Authoritarian Aggression - Democrats	-0.04	0.07	-.68	0.495	-.07	0.06	-1.12	.261
Authoritarian Aggression - Republicans	-.01	0.08	-.08	0.938	-.09	0.08	-1.14	.256
Authoritarian Aggression - Independents	-.16	0.09	-1.74	0.083	-.14	0.08	-1.82	.070
Submission to authority - Democrats	-.05	0.06	-.74	.461	0.04	0.06	.634	.526
Submission to authority - Republicans	-.04	0.09	-.49	.628	0.16	0.07	2.30	**.022**
Submission to authority - Independents	-.04	0.08	-.46	.649	-.08	0.08	-1.09	.277
Economic conservatism - Democrats	0.34	0.18	1.88	.061	0.32	0.17	1.93	.054
Economic conservatism - Republicans	-.52	0.25	-2.11	**.035**	-.25	0.22	-1.16	.247
Economic conservatism - Independents	-.58	0.23	-2.59	**.010**	-.89	0.23	-3.85	**<0.001**

Militaristic conservatism - Democrats	-.14	0.22	-.66	.513	0.09	0.20	.45	.656
Militaristic conservatism - Republicans	.34	0.27	1.27	.205	0.11	0.27	.39	.694
Militaristic conservatism - Independents	0.35	0.28	4.28	.202	0.57	0.23	2.47	**.014**
Observations	806				800			
R^2 / R^2 adjusted	0.23 / 0.20				0.30 / 0.28			

Table A1.06. Studies 1 and 2 regression table for moderated linear regressions examing the relationship between COVID-19 precautions and various ideological measures, after accounting for the effects of the suppressor variables identified in the Main Text. In addition to socially conservative attitudes, the following ideological measures were added to the model: social dominance orientation, submission to authority, authoritarian aggression, economic conservatism, and militaristic conservatism. Further, because we found that these ideological measures interacted with political party at baseline (see figures *A1.06* and *A1.07*), they interacted with political party affiliation in these models as well.

Note that this table displays the conditional effects (based on simple slopes anlayses) of the ideological variables at each level of the moderator variable (political party affiliation). The intercept, interaction terms, and suppressor variables are not included in this table.

7.   **Relationships between socially conservative attitudes and pathogen disgust**

sensitivity

In the Main Text, we claimed that pathogen disgust sensitivity positively correlated with

socially conservative attitudes among Democrats in both studies, among Independents in

Study 2 only, and not among Republicans in either study. Below, we present the results that

lead to that claim.
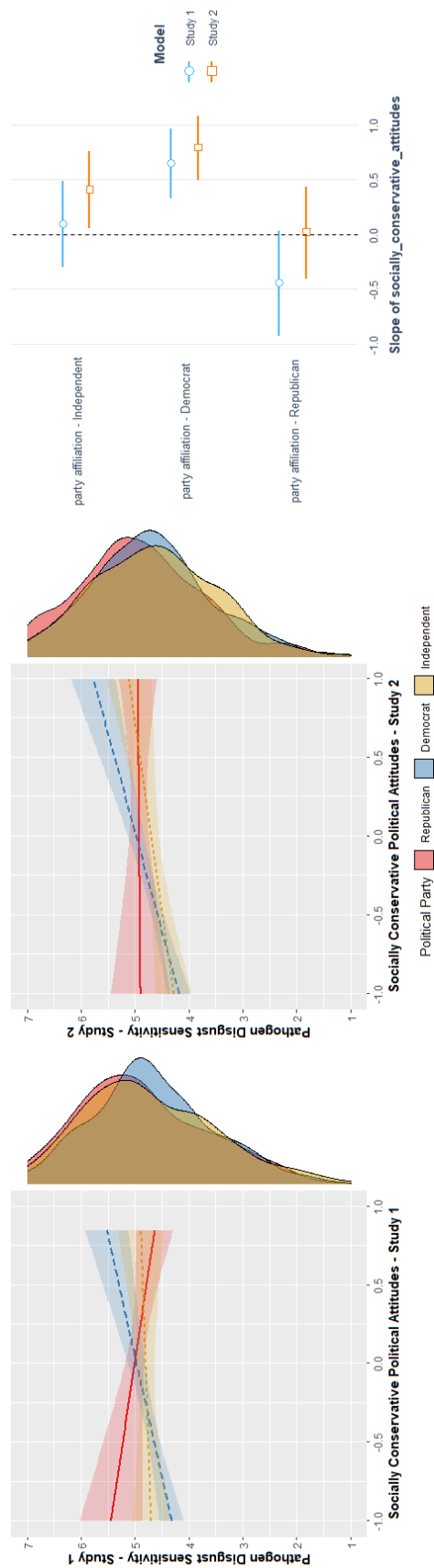
Figure A1.12 Studies 1 and 2 conditional effects of moderated linear regressions, in which the (centered) pathogen disgust sensitivity composite was regressed on socially conservative attitudes, political party affiliation, and their two-way interaction.

The left-two panes show the conditional relationships between socially conservative attitudes and disgust sensitivity by political party. Bands around regression lines are 95% confidence intervals. The density plots along the y-axes represent the raw distributions of pathogen disgust sensitivity by political party.

The right-most pane plots the coefficients obtained from simple slopes analyses for each level of party affiliation across both studies. Coefficients are unstandardized. Lines indicate 95% confidence intervals.

8. **Determining whether liberal media consumption, trust in scientists, trust in liberals and moderates, and economic conservatism suppress the relationship between socially conservative attitudes and disgust sensitivity among Republicans and Independents**

In the main text we report that although we found a positive correlation between socially conservative attitudes and either COVID-19 precautions or pathogen disgust sensitivity among Democrats, those relationships were not consistently found among Republicans or Independents. There are conceptual similarities in these results; a lack of a relationship between socially conservative attitudes and two different measures of pathogen avoidance among supporters of certain political affiliations, but not others. Therefore, we tested whether those variables that suppressed the precautions-socially conservative attitudes among Republicans and Independents–economic conservatism, the trust in scientists composite, and the trust in liberals and moderates composite–also suppressed the relationship between socially conservative attitudes and self-reported pathogen disgust sensitivity.

We did not find evidence for that possibility. In both studies, the joint effects of those three variables did not result in a significant and negative indirect pathway between socially conservative attitudes and precautionary behaviors among Republicans (bootstrapped unstandardized indirect effect = Study 1: -.07, 95% CI [-.28, .12]; Study 2: -.08, 95% CI [-.24, .05]). Among Independents, there was evidence for weak suppression in Study 1 (bootstrapped unstandardized indirect effect = -.24, 95% CI [-.45, -.04), but no significant suppression in Study 2 (bootstrapped unstandardized indirect effect = -.14, 95% CI [-.37, .07]). Although there was a significant suppressive effect among Independents in Study 1, this result did not replicate. Thus, we found minimal evidence for the possibility that the same set of variables are suppressing both

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the precautions-disgust relationship and the precautions-socially conservative attitudes relationship.

9.   **Relationship between economic conservatism and COVID-19 threat concerns among Republicans**

In the main text, we note that among Republicans, economic conservatism positively correlated with weighing the direct health threats of the pandemic as less serious relative to downstream economic and personal liberty threats. We tested whether economic conservatism positively associated with the COVID-19 threats assessment composite scale, where higher scores indicate weighting direct health threats as less serious. Indeed, in both studies, among supporters of all three parties, economic conservatism positively associated with agreement that the direct health threats posed by COVID-19 were less severe, particularly in contrast to the downstream economic and personal liberty threats.
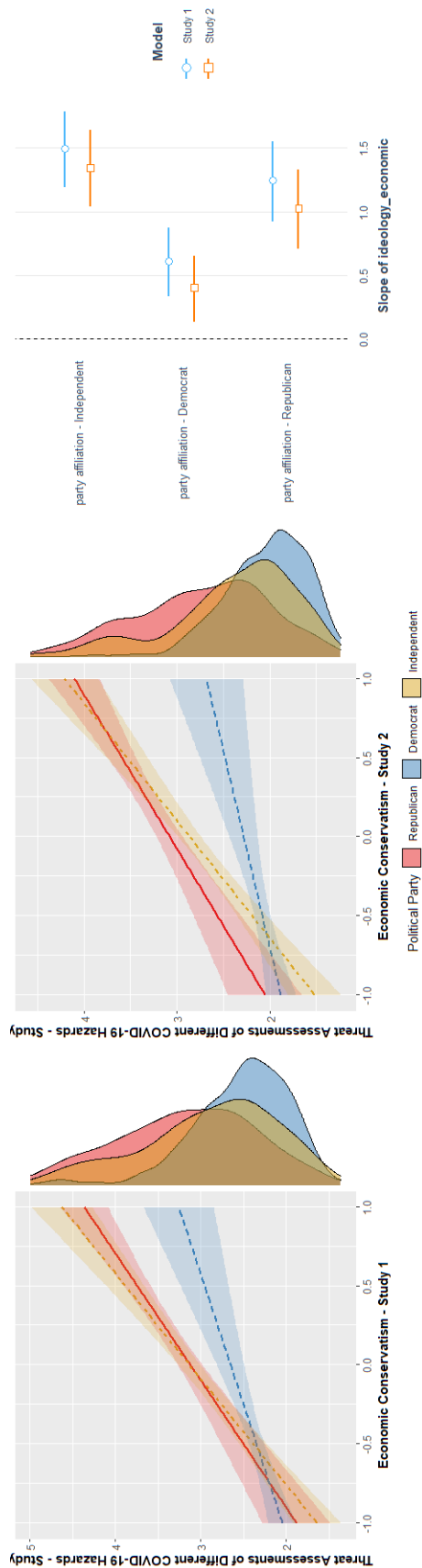
Figure A1.13. Studies 1 and 2 conditional effects of moderated linear regressions, in which threat assessments of different COVID-19 hazards was regressed on the (centered) economic conservatism composite, political party affiliation, and their two-way interaction.

The left-two panes show the conditional relationships between the threat assessments composite and economic conservatism by political party. Bands around regression lines are 95% confidence intervals. The density plots along the y-axes represent the raw distributions of the threat assessments composite by political party. Higher scores along the threat assessments composite on the y-axis indicate finding the direct health threats of the pandemic as less serious, especially compared to economic or personal liberty threats.

The right-most pane plots the coefficients obtained from simple slopes analyses for each level of party affiliation across both studies. Coefficients are unstandardized. Lines indicate 95% confidence intervals.

10.   **Political affiliation differences in economic precautions**

In the main text, we note that Republicans were no more likely to report taking personal steps to buffer themselves against the potential economic consequences of the pandemic than were Democrats or Independents. Here, we show that there are no significant differences among the three partisan categories in the economic precautions composite, which included items such as asking how focused participants were on delaying major financial decisions, or preparing for a major economic downturn.
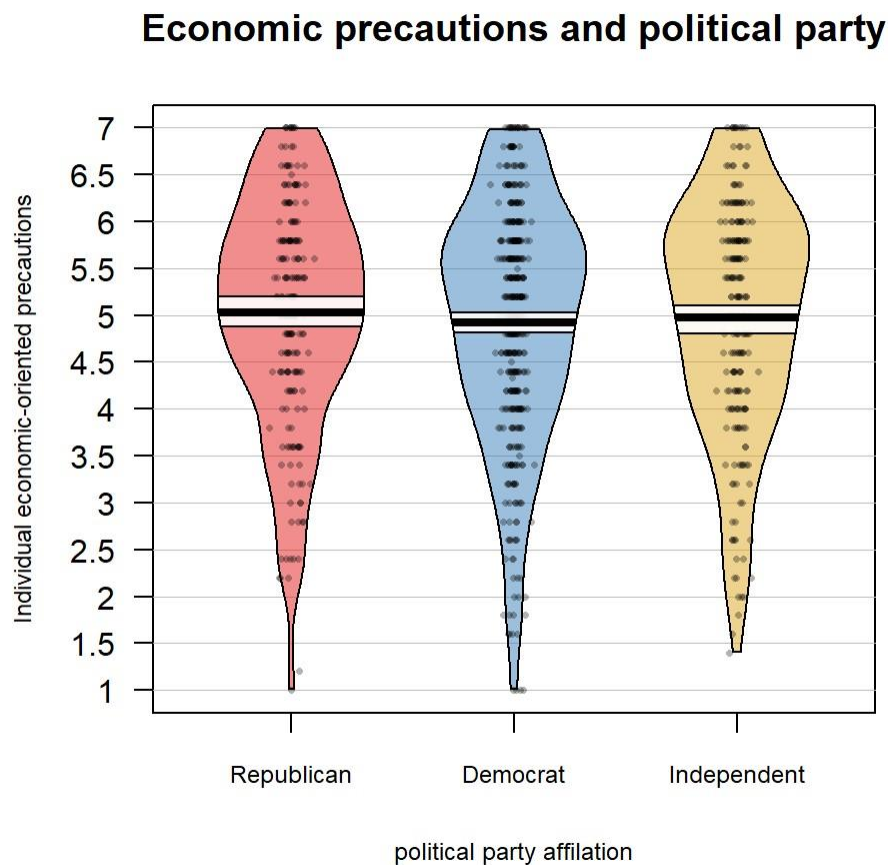
Figure A1.14. Pirate plot comparing differences in self-reported economic precautions by political party, Study 1. Scatterplot points are raw data, jittered to reduce overlap. Beans show

smoothed density of data points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

Economic precautions and political party
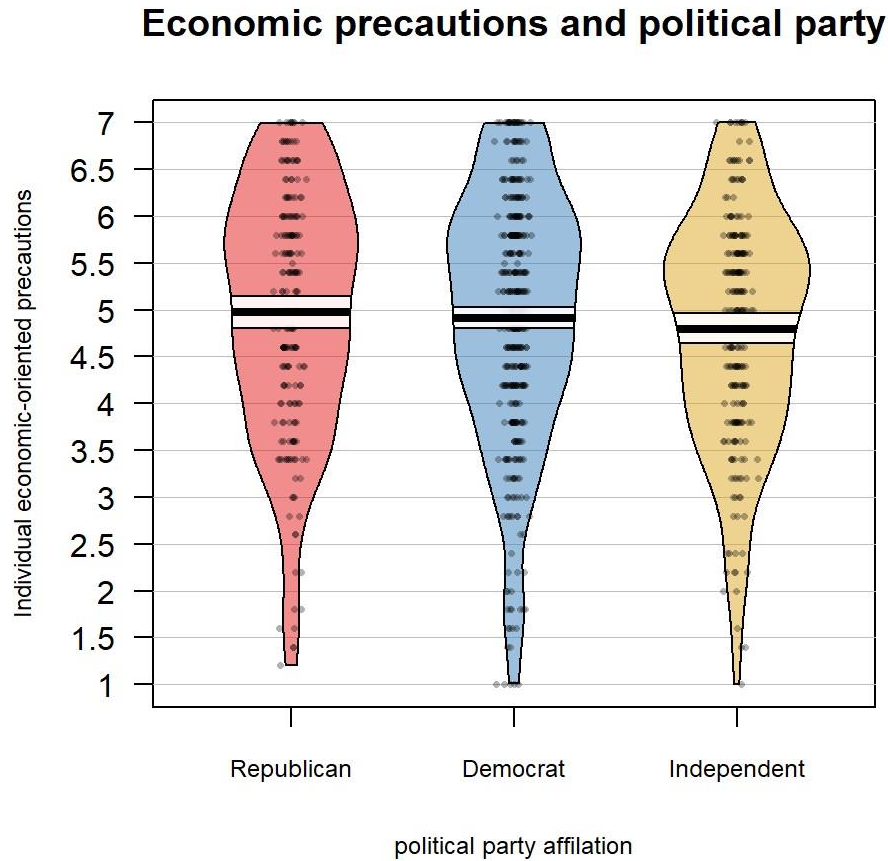
Figure A1.15. Pirate plot comparing differences in self-reported economic precautions by political party, Study 2. Scatterplot points are raw data, jittered to reduce overlap. Beans show smoothed density of data points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

11.   **Perceived health threat of COVID-19 and suppressor variables**

In the Discussion section of the Main Text, we claim that the four suppressor variables

clashed with the perception that COVID-19 poses a substantial health threat, particularly relative

to threats posed to the economy and personal liberties. Here, we demonstrate those

relationships. We individually regressed the COVID-19 threat-assessments composite (where

higher scores indicate perceiving the direct health threat posed by the pandemic to be less

concerning and threatening, but the economic and personal liberty threats as more worrisome, and lower scores the reverse) on each of the four suppressor variables and their interactions with political party affiliation. We find that in among Republicans and Independents, in both studies, lower concern about the direct health threat of the pandemic is associated with lower trust in scientists, lower consumption of liberal news media, lower trust in liberal and moderate information sources, and higher economic conservatism, suggesting that the suppressor variables indeed clash with the perception that COVID-19 poses a serious health threat. Among Democrats, these effects obtain in both studies for trust in scientists and economic conservatism; trust in liberals and moderates in Study 1 but not Study 2; and in neither study for liberal media consumption.
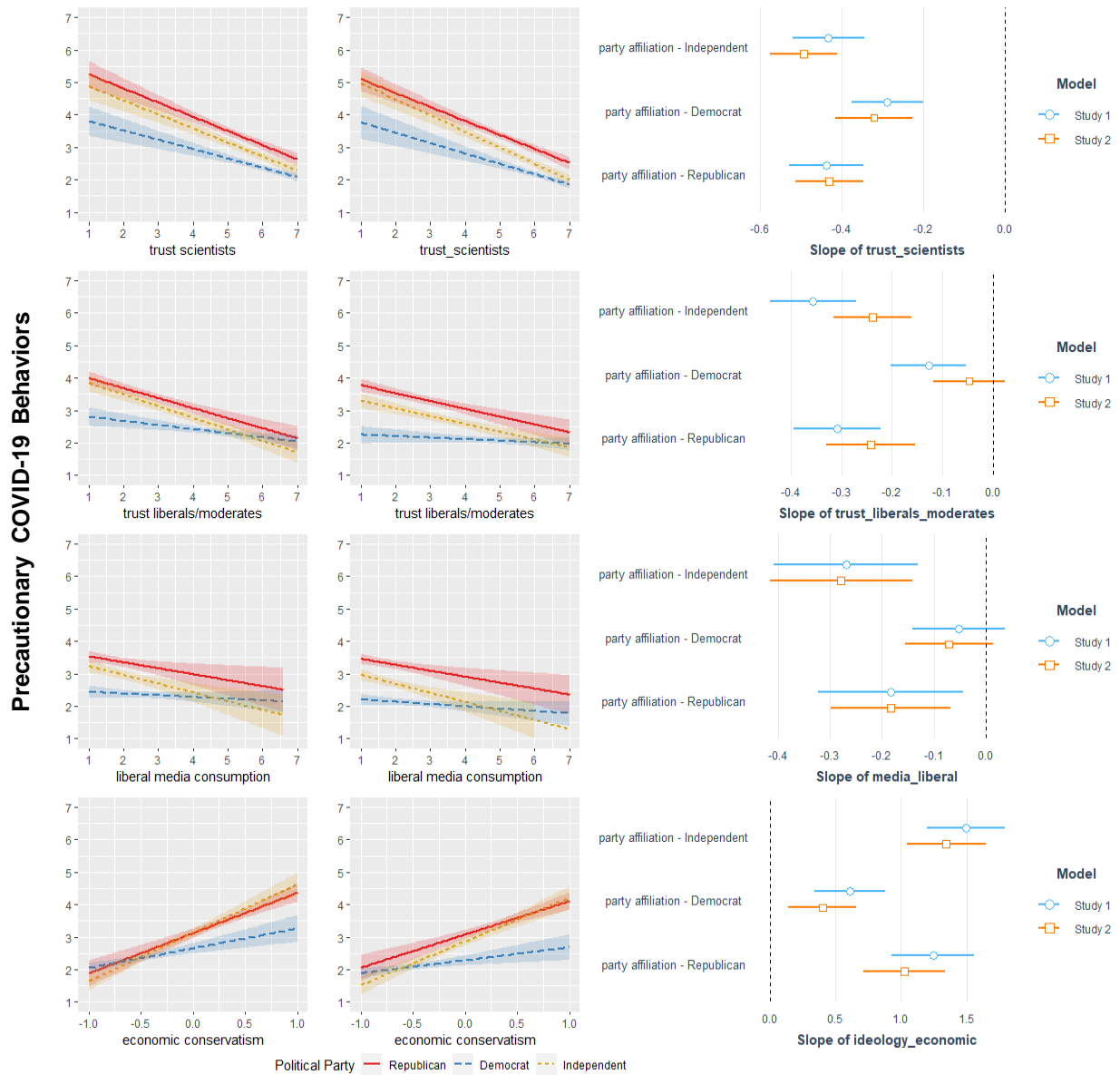
Figure A1.16. Studies 1 and 2 conditional effects of moderated linear regressions, in which threat assessments of COVID-19 hazards was individually regressed on the four (centered) suppressor variables, political party affiliation, and their two-way interactions.

The first two columns show the conditional relationships between the threat assessments composite and the suppressor variables by political party. Bands around regression lines are 95% confidence intervals. Higher scores along the threat assessments composite on the y-axis indicate finding the direct health threats of the pandemic as less serious, especially compared to economic or personal liberty threats.

The right-most column plots the coefficients obtained from simple slopes analyses for each level of party affiliation across both studies. Coefficients are unstandardized. Lines indicate 95% confidence intervals.

Additional Analyses

1. **Relationships between COVID-19 health precautions and trust composites**

In the main text, we hypothesize that differences in trust for various sources of information may shape partisan differences in COVID-19 health precautions. We showed that two composite measures–trust in scientists and trust in liberal and moderate information sources–in part suppressed the relationship between socially conservative attitudes and health precautions among Republicans and Independents, that is, the otherwise positive relationship between social conservatism and prophylaxis is masked by low trust in scientists and low trust in liberal and moderate information sources. However, it is also worth investigating the zero-order correlations between the three trust composites and health precautions by political party, in order to explore the partisan relationship between COVID-19 prophylaxis and trust more broadly. As illustrated in Figure S16, in both Study 1 and Study 2, trust in liberal and moderate information sources correlated with precautionary behaviors among Republicans and Independents, but not Democrats. The other trust-precautions relationships were not consistent across Studies 1 and 2. In Study 1, trust in scientists correlated with precautions among Republicans and Independents, but not Democrats; however, in Study 2, that correlation was significant in supporters of all three major party affiliations (although the effect was substantially smaller in Democrats relative to Republicans and Independents). Trust in conservative information sources positively correlated

with precautions among Democrats in Study 1, but not Study 2, whereas the positive association obtained among Republicans in Study 2, but not Study 1. Because of the inconsistency of these latter effects, it would be erroneous to draw any specific and conclusive interpretations; nevertheless, in general, these results suggest that trust in scientists and trust in liberals and moderates positively associate with precautions in a party-specific manner.

Lastly, the density plots indicate that Democrats were more trusting of scientific and liberal and moderate sources, and less trusting of conservative sources, relative to Republicans. Independents were intermediate along these dimensions.
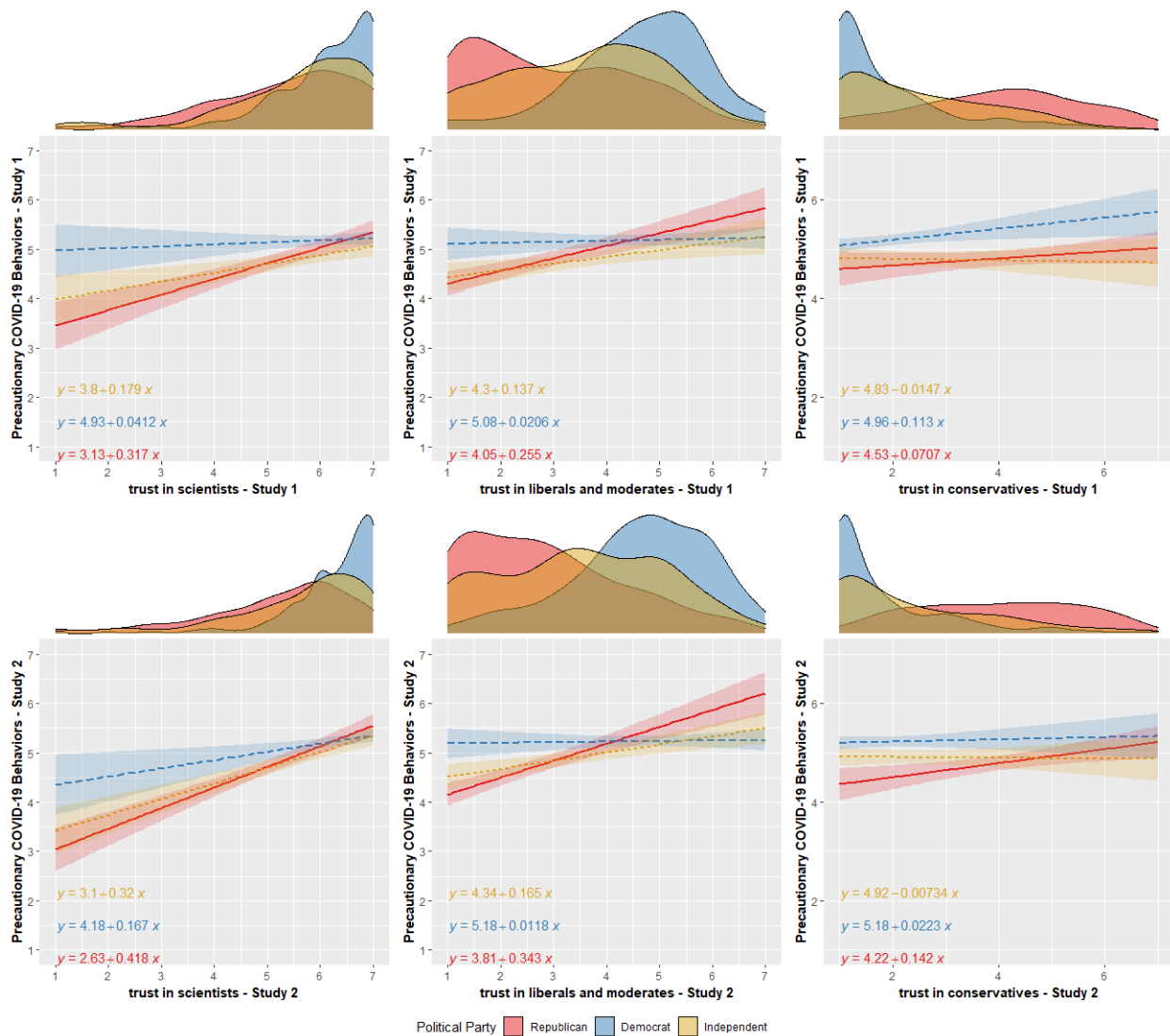
Figure A1.17. Studies 1 and 2 conditional effects of moderated linear regressions in which COVID-19 precautions were separately regressed on each individual (centered) composite trust measure, political party affiliation, and the two-way interaction between party affiliation and the particular trust composite. Bands around regression lines are 95% confidence intervals. The density plots along the x-axes represent the raw distributions of the trust composites by political affiliation. On each plot, regression equations indicate the conditional simple slopes relationships between trust composites and COVID-19 precautions by political affiliation (slopes are unstandardized).

Relationships between COVID-19 health precautions and media consumption composites

In the main text, we hypothesize that differences in media consumption for various sources of partisan information may shape political differences in COVID-19 health precautions. We found evidence that one of the partisan media consumption composites–consumption of liberal news media–in part suppressed the relationship between socially conservative attitudes and health precautions among Republicans and Independents. However, following the same logic as in the previous section, it is also worth investigating the zero-order correlations between the two composites (liberal media consumption, and conservative media consumption), and precautions by political party, in order to explore the partisan relationship between COVID-19 prophylaxis and media consumption more broadly.

Self-reported consumption of liberal-leaning media sources positively correlated with COVID-19 precautionary behaviors among Republicans, Democrats, and Independents, while self-reported consumption of conservative-leaning media sources positively correlated with precautions only among Democrats and Republicans, not Independents, see plot below. Unsurprisingly, the density plots indicate that Democrats consume more liberal news relative to non-Democrats, and that Republicans consume more conservative news relative to non-Republicans. Note, however, that even among Republicans, there were very low levels of self-reported conservative media consumption. This result could be due to the specific conservative

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media outlets that we chose to include in the survey, which may not be highly consumed by the conservatives we happened to recruit in our sample. For example, media figures that primarily operate on platforms such as YouTube and Twitter were not included in the survey, which may be more popular with participants recruited from MTurk. Conversely, the kinds of media outlets that conservatives in our sample may consume more frequently may not have been included in our survey, since the list of media outlets was not exhaustive. Further, because participants were asked to rate their consumption of many different outlets, which were then averaged into a composite, the inclusion of possibly rarely consumed conservative media outlets may be disproportionally depressing that average relative to the outlets included in the liberal media composite. We further note that this extreme skew likely affects and limits the interpretability of any inferential analyses that include the conservative media consumption composite. Most notably, the fact that conservative media consumption did not suppress the relationship between socially conservative attitudes and precautionary COVID-19 behaviors in our suppression analyses, while liberal media consumption did, may be attributable to the lack of variation in the conservative media consumption composite, rather than a true null effect of conservative media consumption on that relationship.
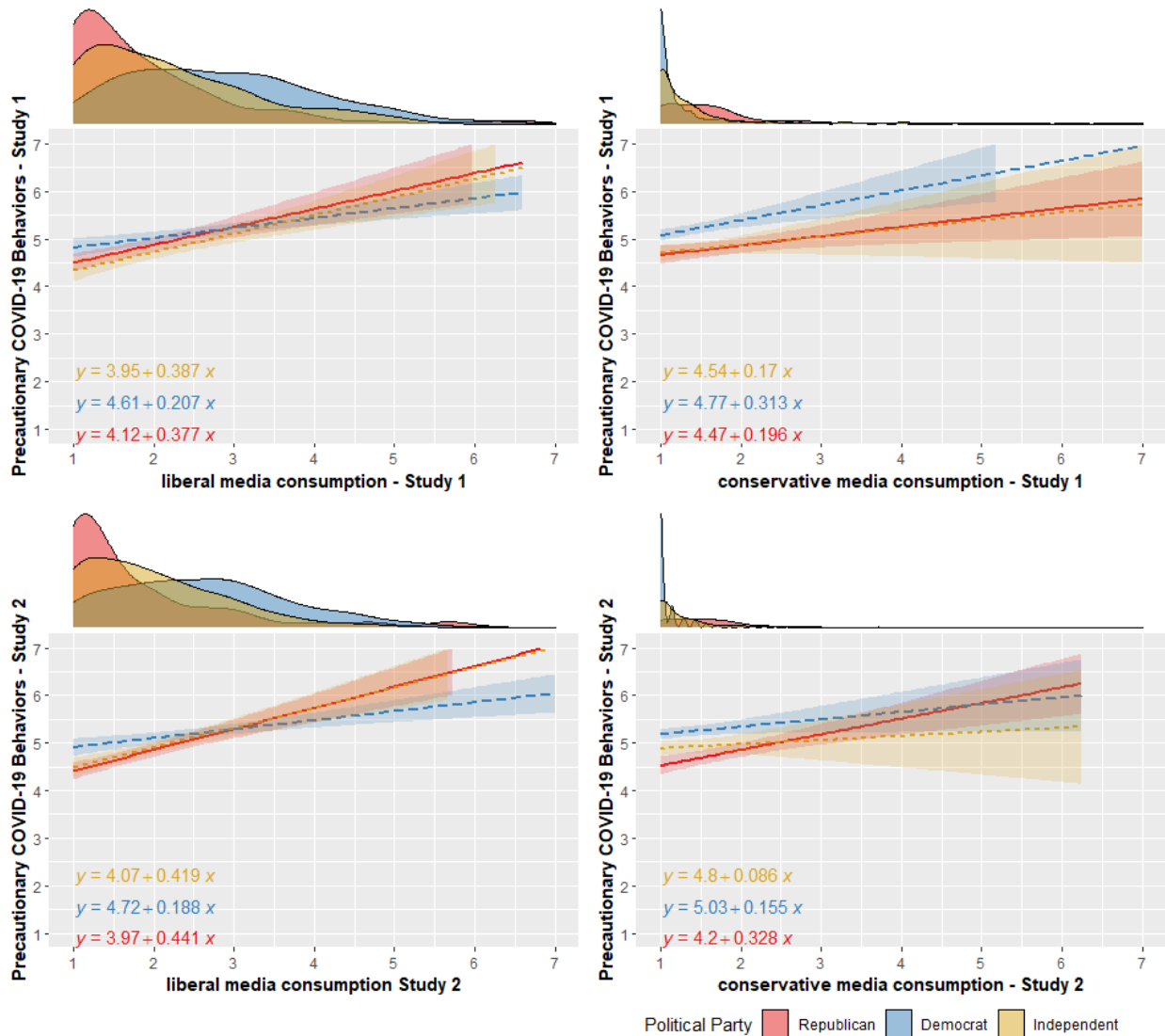
Figure A1.18. Studies 1 and 2 conditional effects of moderated linear regressions in which COVID-19 precautions were separately regressed on each individual (centered) composite media consumption measure, political party affiliation, and the two-way interaction between party affiliation and the particular media consumption composite. Bands around regression lines are 95% confidence intervals. The density plots along the x-axes represent the raw distributions of the media consumption composites by political affiliation. On each plot, regression equations indicate the conditional simple slopes relationships between the media consumption composites and COVID-19 precautions by political affiliation (slopes are unstandardized).

Additionally, total news consumption from any source (including sources that may not

have been listed among the items that constituted the partisan news consumption composites)

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positively correlated with precautions among Democrats and Republicans, but not Independents, in Study 1. In Study 2, those relationships only approached significance.
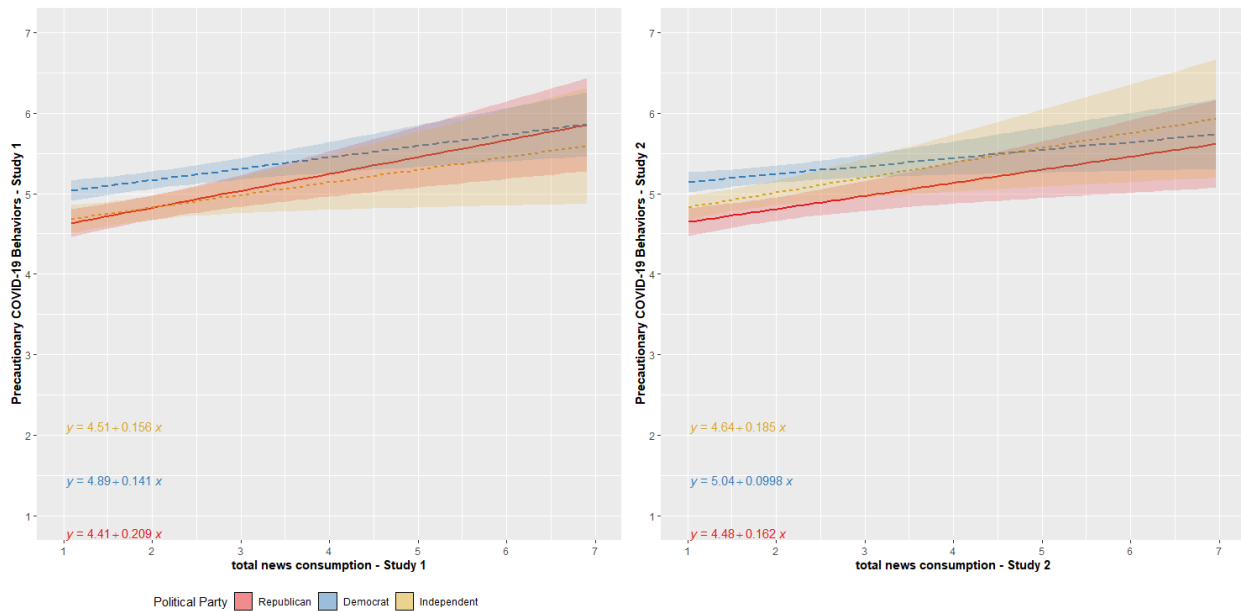
Figure A1.19. Studies 1 and 2 conditional effects of moderated linear regressions in which COVID-19 precautions were regressed on total news consumption (centered), political party affiliation, and the two-way interaction between party affiliation and total news consumption. Bands around regression lines are 95% confidence intervals. On each plot, regression equations indicate the conditional simple slopes relationships between total news consumption and COVID-19 precautions by political affiliation (slopes are unstandardized).

Relationships between COVID-19 health precautions, political party, and cost-benefit assessments of COVID-19 threats composite

In the main text, we hypothesized that partisan differences in responses to the COVID-19 outbreak may be shaped by differential cost-benefit analyses of the various threats posed by the pandemic, including the direct health threats, as well as the downstream economic and perceived personal liberty threats.

Examining Democrats, Republicans, and political Independents, there was a significant effect linking party affiliation to greater beliefs that the direct health threats of the pandemic

were less serious, especially relative to the economic and personal liberty threats (Study 1: F[2, 861] = 73.23, p < 2e-16; Study 2: F[2, 857] = 109.90, p < 2e-16). Post hoc comparisons using the Tukey HSD test indicate that Republicans (Study 1: M = 3.38, SD = 1.20; Study 2: M = 3.30, SD = 1.19) were significantly more likely than Democrats (Study 1: M = 2.35, SD = .84, p < 2e16; Study 2: M = 2.09, SD = .735, p < 2e-16) or Independents (Study 1: M = 2.93, SD = 1.20, p = 2.23-5; Study 2: M = 2.09, SD = 1.13, p = 2.10e-10) to weight health threats less seriously relative to economic and personal liberty threats, and that Independents were in turn significantly higher along that scale compared to Democrats (Study 1: p = 6.47e-11; Study 2: p = 1.07-e13). In sum, compared to Democrats, Republicans and Independents weighted the health threats posed by the pandemic as less severe, particularly in relation to economic and personal liberty threats.

Further, we examined the party-specific relationships between the relative cost assessments of different COVID-19 threats and precautionary health behaviors. We found that weighing the direct health threats of the pandemic as less serious relative to the economic and personal liberty threats negatively correlated with precautionary health behaviors among Republicans and Independents, but not Democrats. These results suggest that domain-specific cost-benefit threat weightings may indeed influence partisan differences in precautionary health behaviors in response to the pandemic.
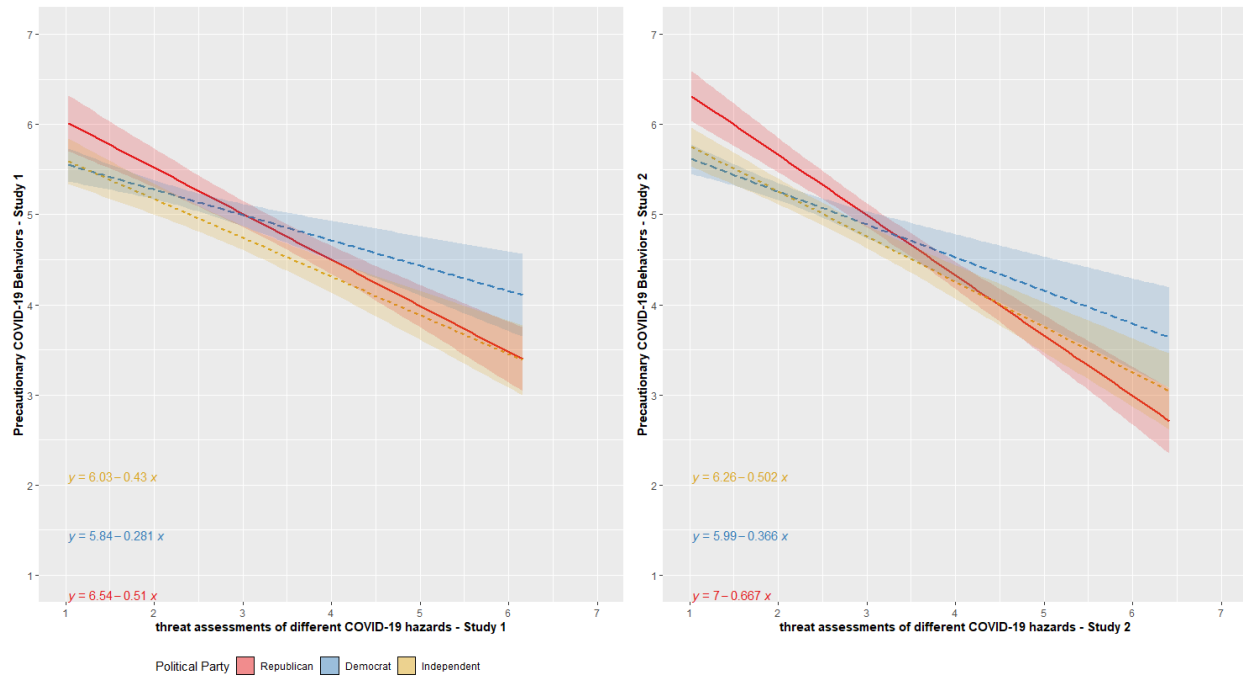
Figure A1.20. Studies 1 and 2 conditional effects of moderated linear regressions in which COVID-19 precautions were regressed on the (centered) threat assessments of different COVID-19 hazards composite, political party affiliation, and the two-way interaction between party affiliation and the threat assessments composite. Bands around regression lines are 95% confidence intervals. On each plot, regression equations indicate the conditional simple slopes relationships between the threat assessments composite and COVID-19 precautions by political affiliation (slopes are unstandardized). Higher scores along the threat assessments composite indicate finding the direct health threats of the pandemic as less serious, especially compared to economic or personal liberty threats.

Finally, the party-specific relationships between the domain-specific threat assessments composite and socially conservative attitudes were examined. Among Democrats and Independents, but not Republicans, socially conservative attitudes were associated with weighing health threats as less serious relative to economic and personal liberty hazards. We speculate that the lack of an association among Republicans may be attributable to a ceiling effect. Further, it is noteworthy that while socially conservative attitudes positively correlated with health precautions among Democrats, they also positively associated with weighing the health hazards posed by the pandemic as less serious relative to the economic and personal liberty threats.
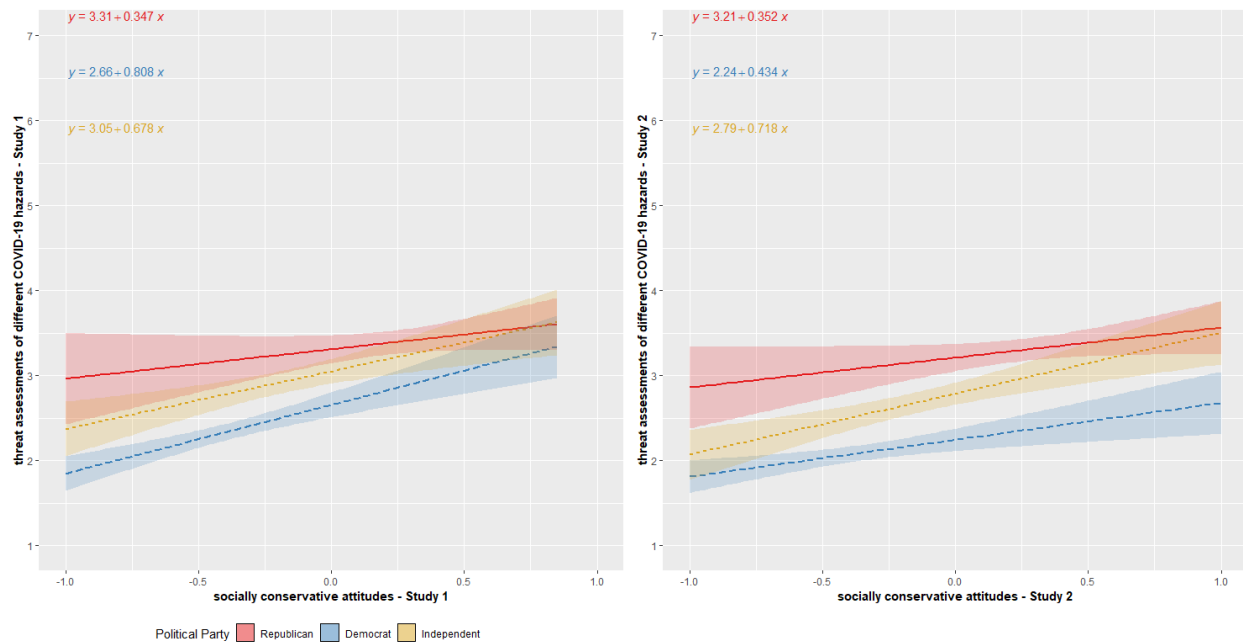
Figure A1.21. Studies 1 and 2 conditional effects of moderated linear regressions in which the threat assessments of different COVID-19 hazards composite was regressed on the (centered) socially conservative attitudes composite, political party affiliation, and the two-way interaction between party affiliation and socially conservative attitudes. Bands around regression lines are 95% confidence intervals. On each plot, regression equations indicate the conditional simple slopes relationships between the threat assessments composite and socially conservative attitudes by political affiliation (slopes are unstandardized). Higher scores along the threat assessments composite indicate finding the direct health threats of the pandemic as less serious, especially compared to economic or personal liberty threats.

2. **Relationships between COVID-19 health precautions and opinions regarding government public health interventions**

   We speculated that general opinions about government public health interventions may contribute to partisan differences in responses to the COVID-19 outbreak. In Studies 1 and 2, we measured opinions about public health interventions in non-COVID-19 related areas by gauging participants' agreement with government interventions regarding tobacco use. Although these opinions did not suppress the relationship between socially conservative attitudes and COVID-19 precautionary behaviors among Republicans, we examined the simple effects of public health intervention endorsement on precautionary COVID-19 health behaviors by political party.

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Supportive attitudes toward government intervention in tobacco use–which proxies attitudes

toward public health policies in non-COVID-19 areas–positively correlated with precautionary

behaviors among Republicans in both studies. In Study 1, that positive association obtained

among Democrats but only approached significance among Independents, while in Study 2, the

relationship was significant among Independents, but approached significance among

Democrats. Based on the density plot distributions, Democrats were more supportive of public

health interventions regarding tobacco use relative to Republicans and Independents.
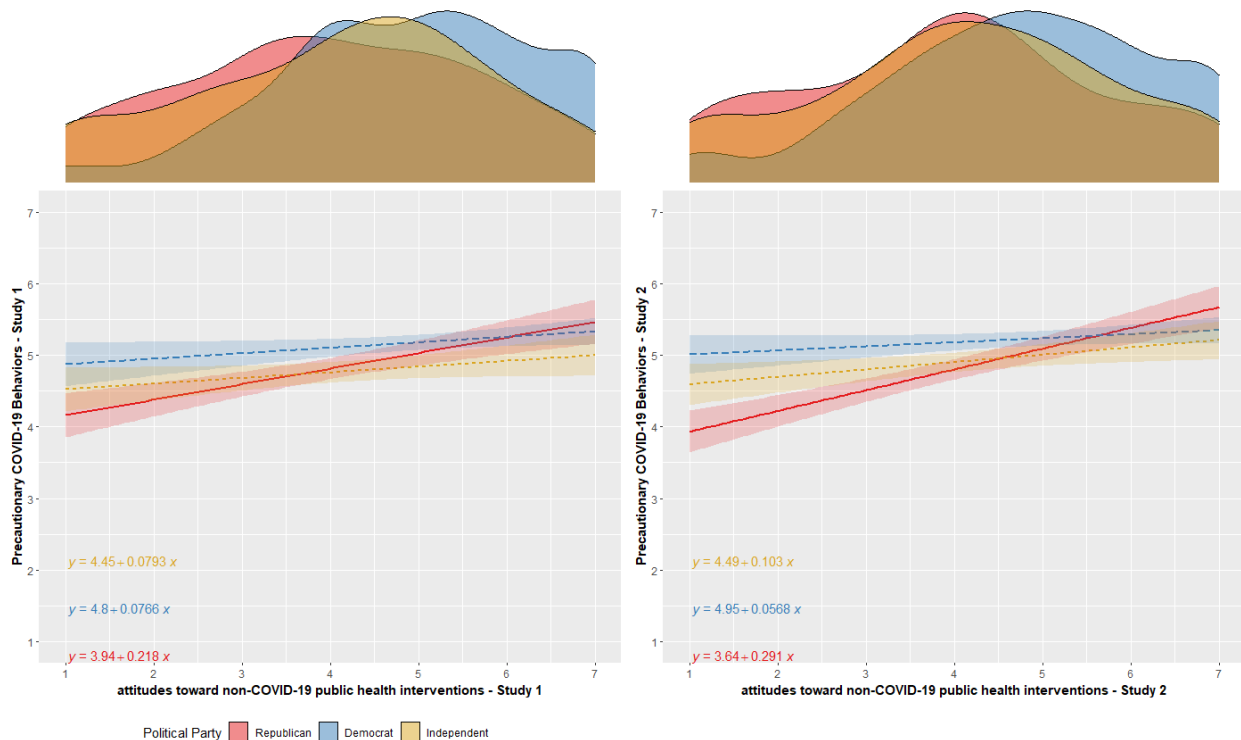
A1.22. Studies 1 and 2 conditional effects of moderated linear regressions in which the (centered) precautionary COVID-19 behaviors composite was regressed on attitudes toward non-COVID-19 public-health interventions, political party affiliation, and the two-way interaction between party affiliation and attitudes toward public health interventions. Bands around regression lines are 95% confidence intervals. On each plot, regression equations indicate the conditional simple slopes relationships between the COVID-19 precautions and attitudes toward public health interventions by political affiliation (slopes are unstandardized). Higher scores along the x-axes indicate stronger agreement with government interventions in non-COVID-19 public health domains.

3. **Relationships between COVID-19 health precautions and demographic variables**

We collected basic demographic information about the participants, which we can use to examine the effects of different demographic variables on COVID-19 health precautions. As we highlighted in the main text, Republicans and Democrats differ, on average, along a number of different demographic dimensions. Especially relevant for COVID-19, Democrats are more likely to live in high-density areas, and at the time data were collected, the estimated distribution of coronavirus outbreaks across the United States was highly skewed along geographic and urban/rural lines. Although none of the demographic variables were responsible for suppressing the socially conservative attitudes-precautions relationship among Republicans and Independents, and demographics did not account for the positive correlation between socially conservative attitudes and precautions among Democrats, it is still of interest to examine the relationships between various demographic factors, and health prophylaxis. Here, we systematically assess those relationships.

Age

There was no zero order relationship between age and precautionary COVID-19 behaviors in either study.
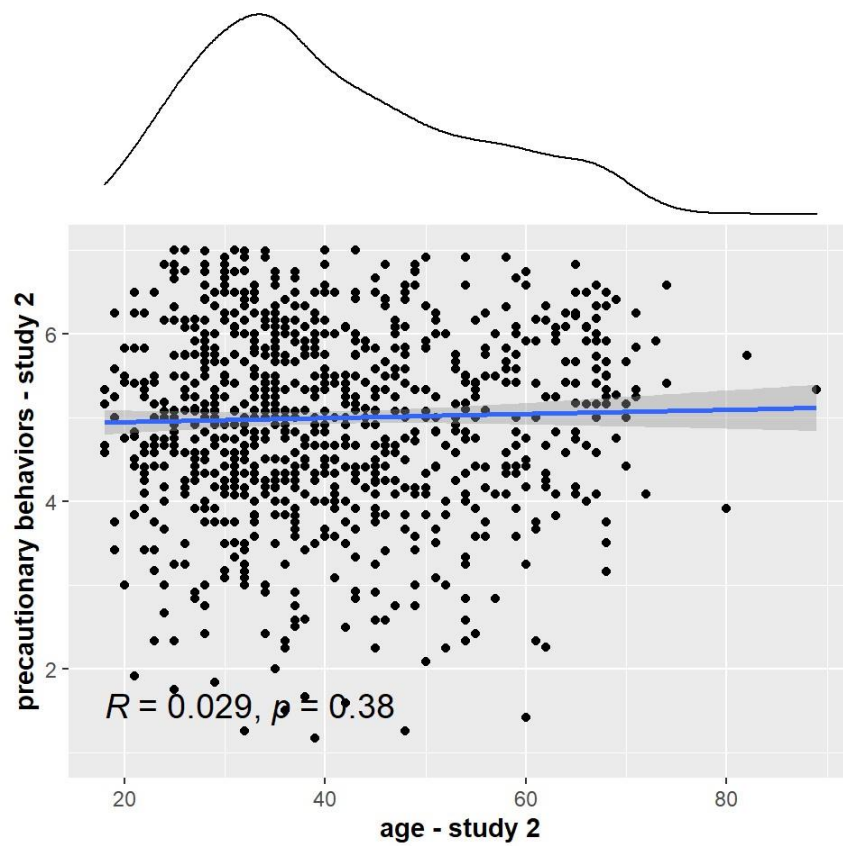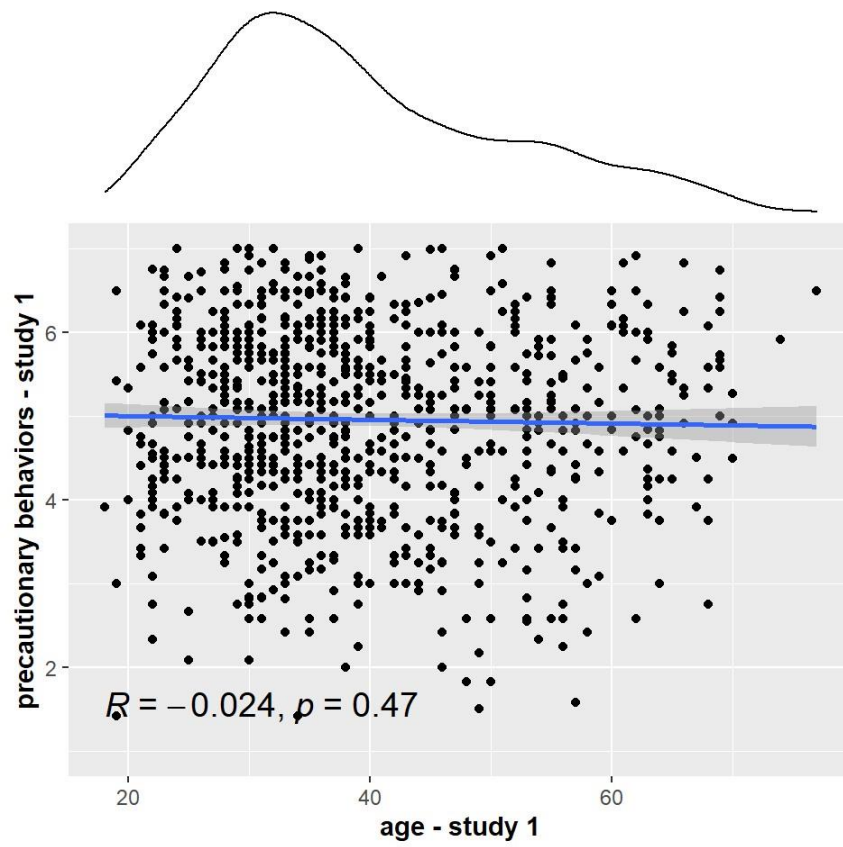
Figure A1.23. Relationships between age and precautionary COVID-19 behaviors. The density plots along the x-axes represent the age distribution of the sample. Further, scatterplot points have been randomly jittered along the y-axes to aid interpretability.

Gender

On average, women engaged in significantly more health precautions than men, consistent with the broader literature on sex differences in risk-taking (Sparks et al., 2018).

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Figure A1.24. Pirate plot comparing differences in COVID-19 health precautions by gender, Study 1. Scatterplot points are raw data, jittered to reduce overlap. Beans show smoothed density of scatterplot points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

covid precautionary behaviors by gender
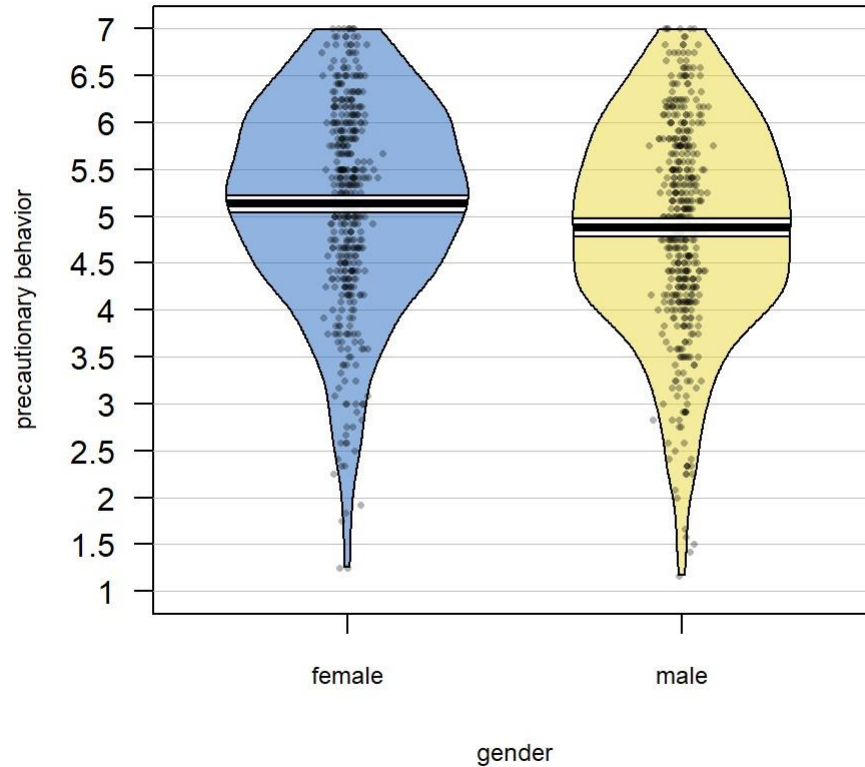
Figure A1.25. Pirate plot comparing differences in COVID-19 health precautions by gender, Study 2. Scatterplot points are raw data, jittered to reduce overlap. Beans show smoothed density of scatterplot points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

Ethnicity

Because participants in both studies overwhelmingly self-identified as white (Study 1: 69%, Study 2: 76%), we did not have large enough samples to adequately compare among individuals who self-identified with particular non-white identities. Therefore, in this analysis, we used a simple binary ethnicity variable, with participants who self-identified as non-white on the one hand, and participants who self-identified as white on the other. On average, people who

self-identified as non-white engaged in significantly more health precautions than people who

identified as white.

covid precautionary behaviors by ethnicity
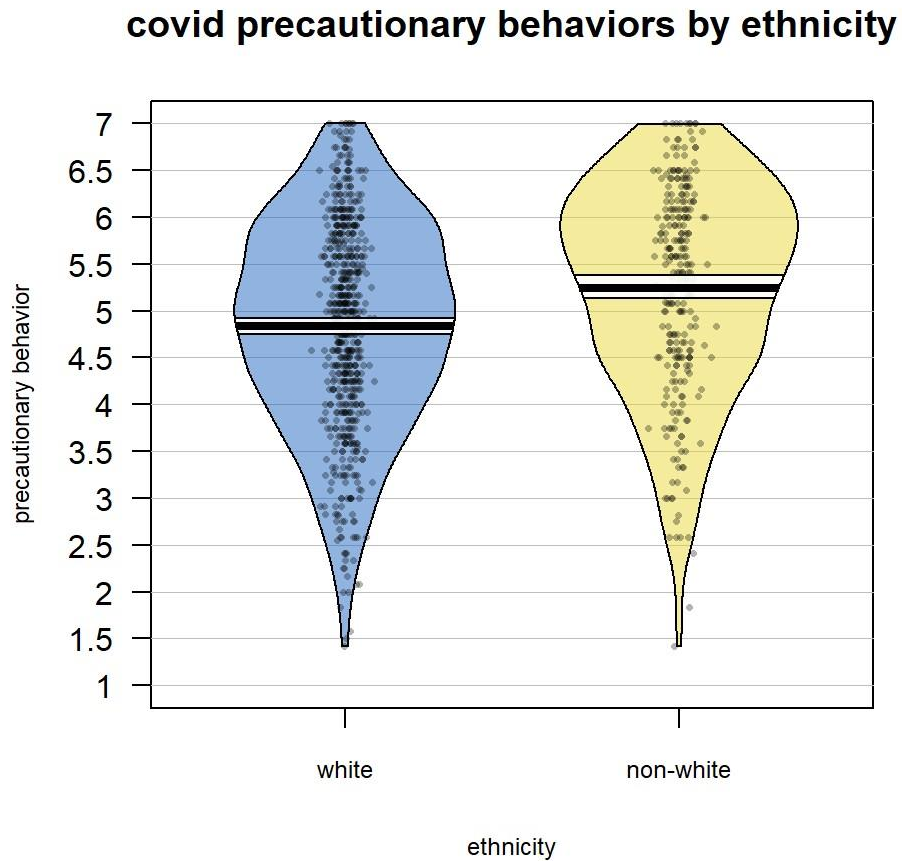
Figure A1.26. Pirate plot comparing differences in COVID-19 health precautions by self-identified ethnicity, Study 1. Scatterplot points are raw data, jittered to reduce overlap. Beans show smoothed density of scatterplot points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

covid precautionary behaviors by ethnicity
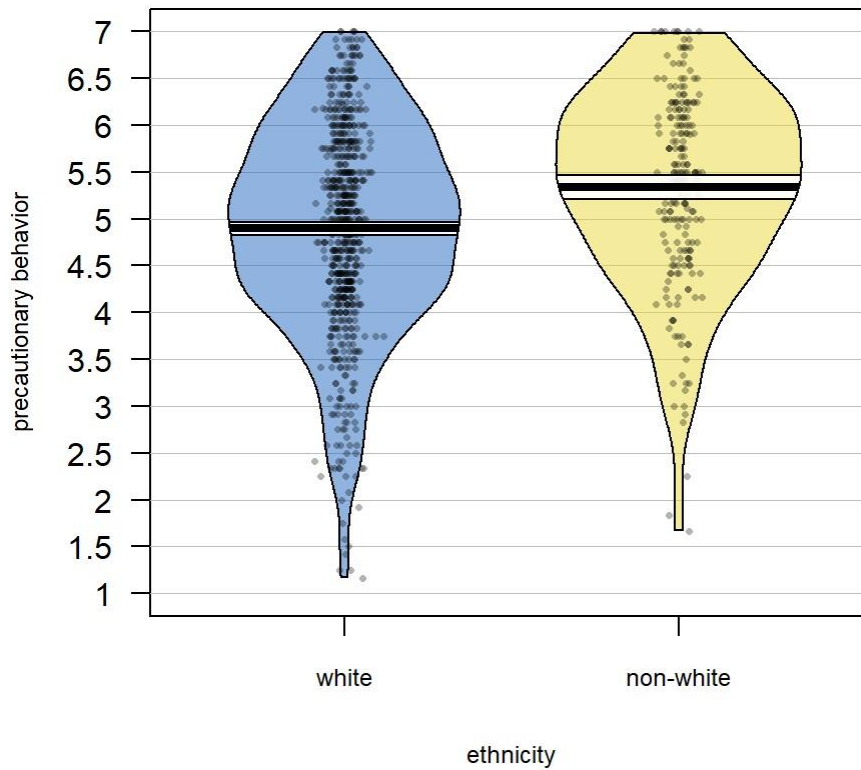
Figure A1.27. Pirate plot comparing differences in COVID-19 health precautions by self-identified ethnicity, Study 2. Scatterplot points are raw data, jittered to reduce overlap. Beans show smoothed density of scatterplot points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

Income

Income did not correlate with COVID-19 health precautions in Study 1, and weakly correlated with precautions in Study 2.
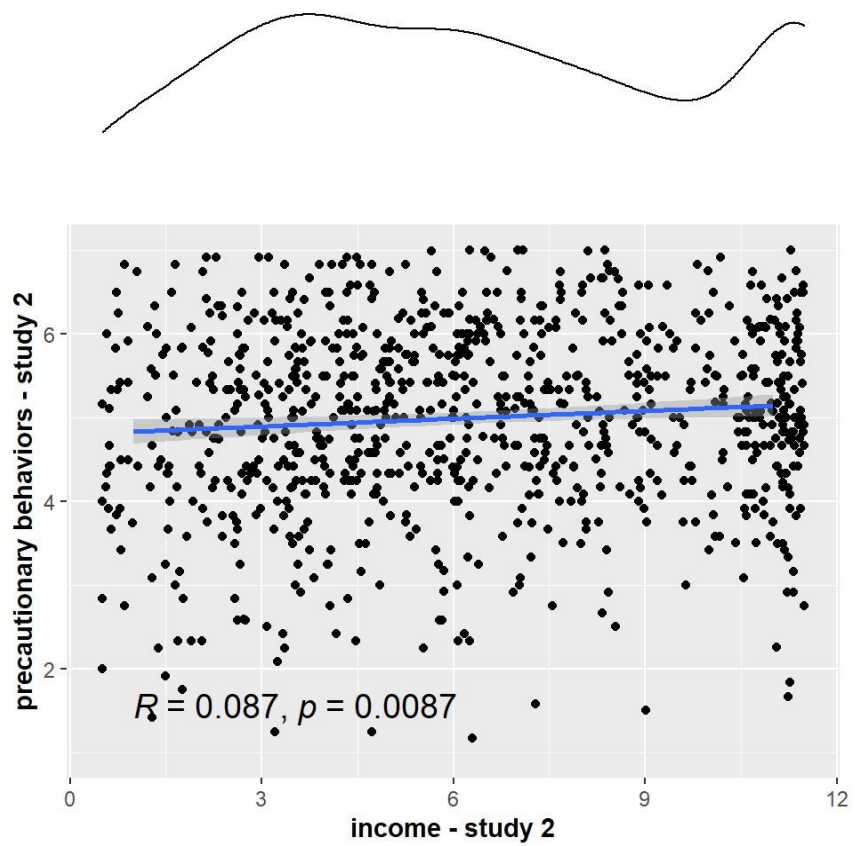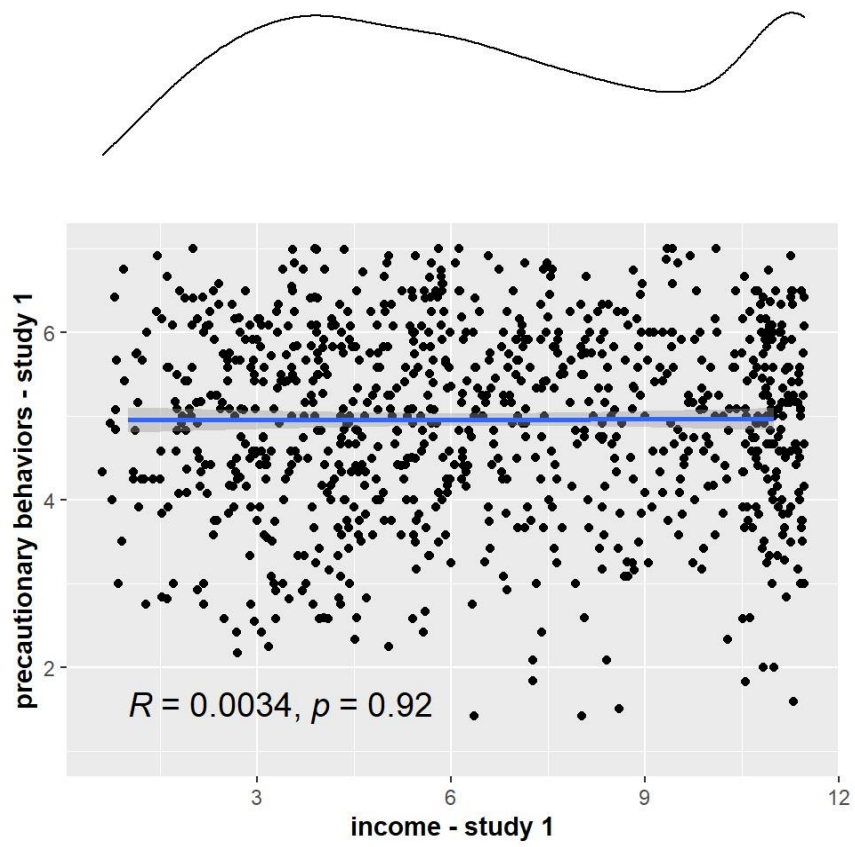
Figure A1.28. Relationships between income and precautionary COVID-19 behaviors. The density plots along the x-axes represent the income distribution of the sample. Further, scatterplot points have been randomly jittered along the y-axes to aid interpretability.

Education

Overall, education did not correlate with COVID-19 health precautions in either study.

covid precautionary behaviors by education
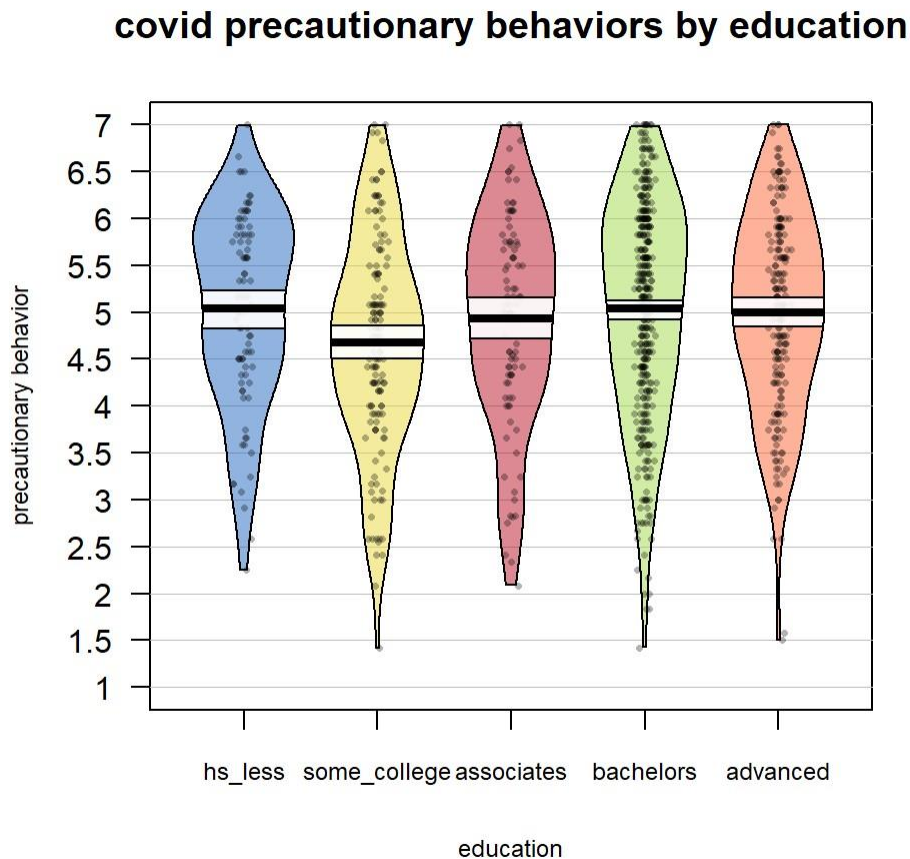
Figure A1.29. Pirate plot comparing differences in COVID-19 health precautions by educational attainment, Study 1. Scatterplot points are raw data, jittered to reduce overlap. Beans show smoothed density of scatterplot points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

covid precautionary behaviors by education
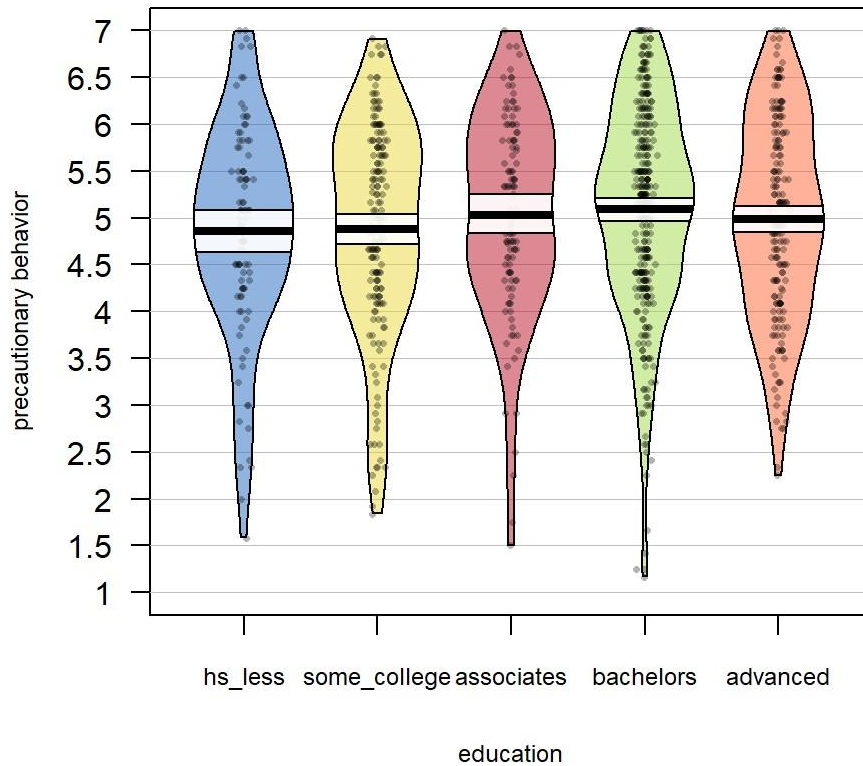
Figure A1.30. Pirate plot comparing differences in COVID-19 health precautions by educational attainment, Study 2. Scatterplot points are raw data, jittered to reduce overlap. Beans show smoothed density of scatterplot points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

Job Requirements

Having jobs that required participants to leave the home for work did not associate with

COVID-19 precautions in either study.

covid precautionary behaviors by job requirements
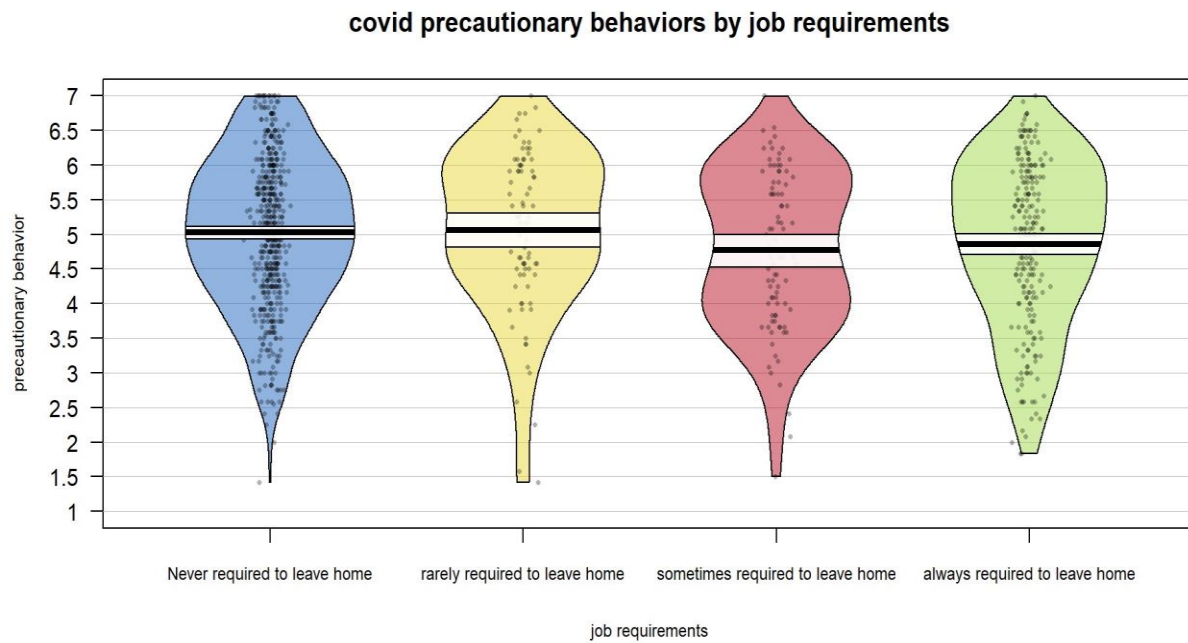
Figure A1.31. Pirate plot comparing differences in COVID-19 health precautions by job requirements, Study 1. Scatterplot points are raw data, jittered to reduce overlap. Beans show smoothed density of scatterplot points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

covid precautionary behaviors by job requirements
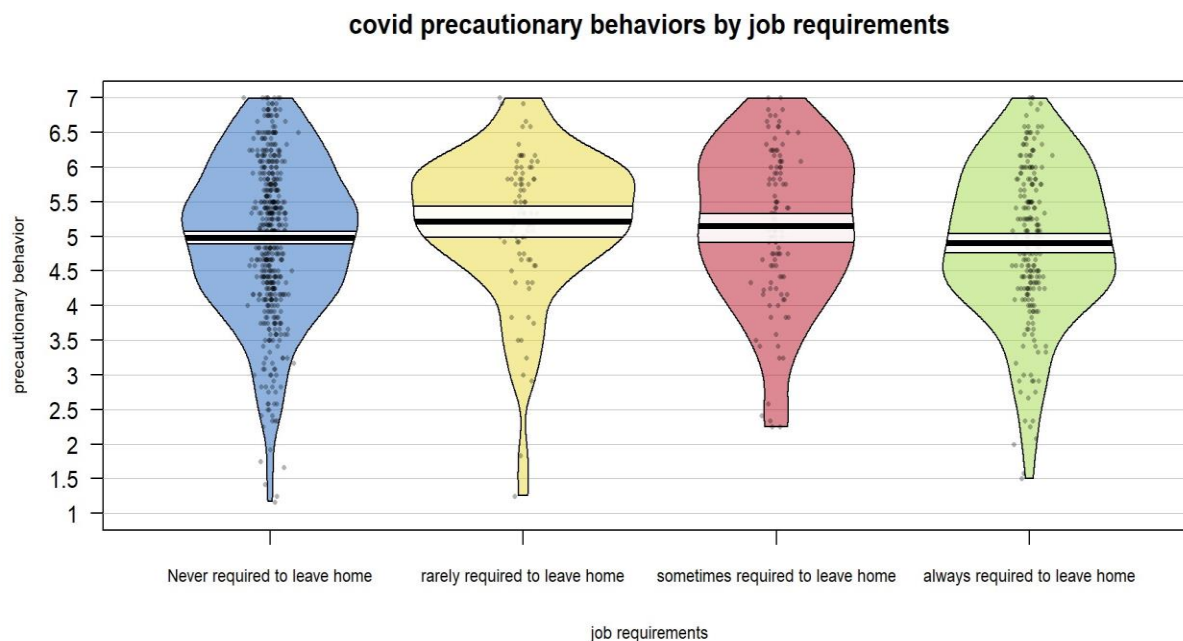
Figure A1.32. Pirate plot comparing differences in COVID-19 health precautions by job requirements, Study 2. Scatterplot points are raw data, jittered to reduce overlap. Beans show smoothed density of scatterplot points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

Pre-existing health conditions

Participants who reported having any health conditions that may render them more susceptible to severe COVID19 illness reported, on average, engaging in more COVID-19 health precautions. The possible health conditions presented to participants were as follows: autoimmune disease, immunological deficiency, diabetes, hypertension, coronary heart disease, asthma, kidney disease, or other. A binary variable was created, with participants who reported having at least one of the aforementioned health conditions on the one hand, and participants who did not report any of those health conditions on the other.

covid precautionary behaviors by health condition
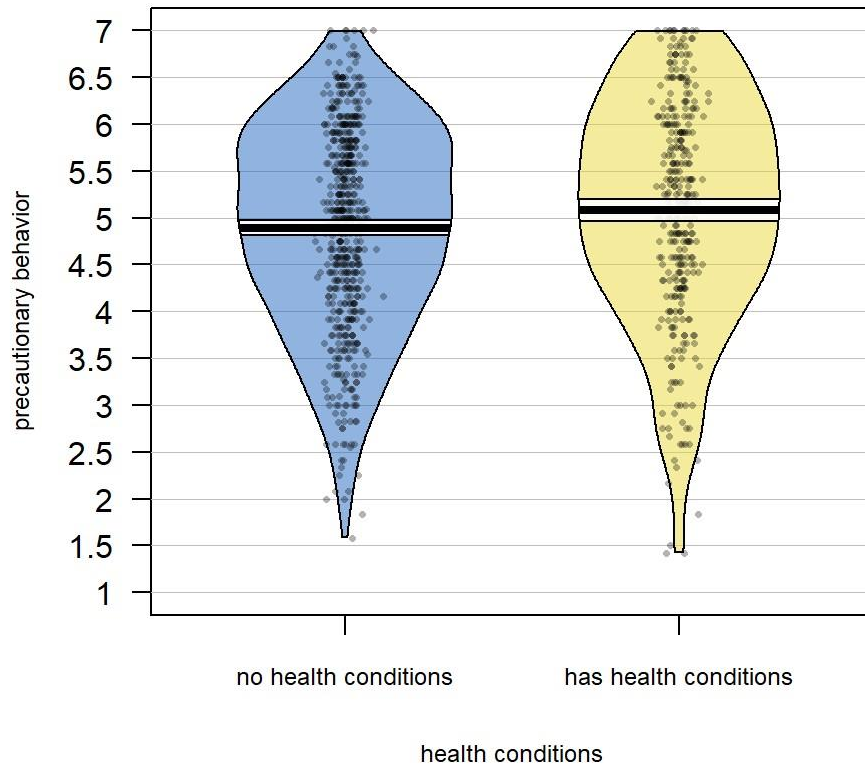
Figure A1.33. Pirate plot comparing differences in COVID-19 health precautions by health conditions, Study 1. Scatterplot points are raw data, jittered to reduce overlap. Beans show smoothed density of scatterplot points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

covid precautionary behaviors by health condition
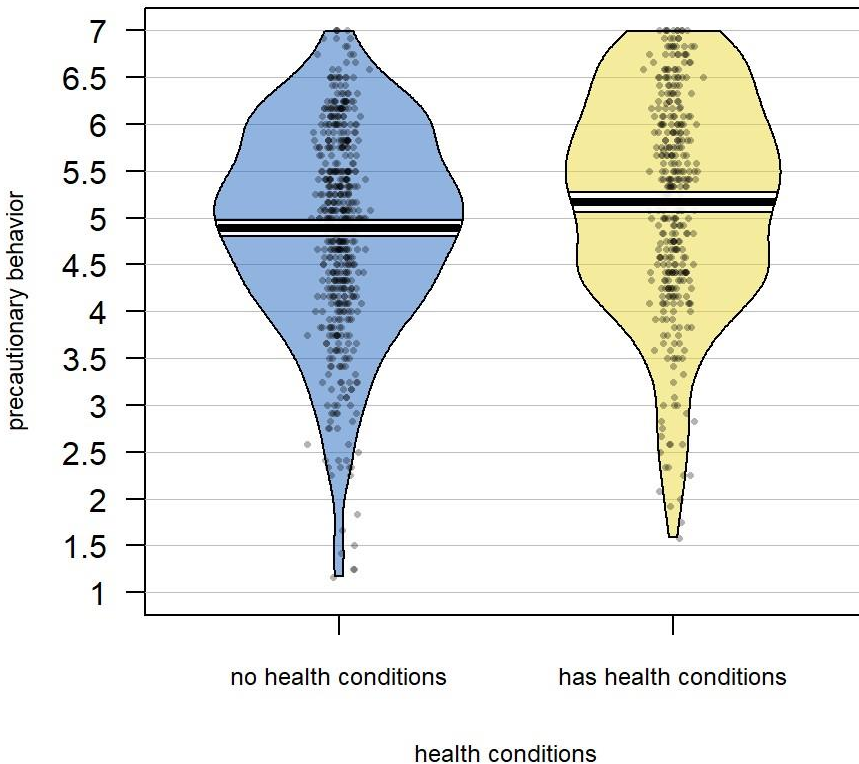
Figure A1.34. Pirate plot comparing differences in COVID-19 health precautions by health conditions, Study 2. Scatterplot points are raw data, jittered to reduce overlap. Beans show smoothed density of scatterplot points. Bars and boxes represent means and Bayesian 95% highest density intervals, respectively.

4. **Item-by-item analyses of political party differences in precautionary COVID-19 health behaviors**

In the main text, we reported finding in both studies an effect of political party support on average levels of the precautionary COVID-19 behaviors composite, such that Democrats reported engaging in more precautions on average than Republicans or Independents. Here, we break down that composite scale into its individual items, asking which items may be driving observed differences between Republicans, Democrats, and Independents. A series of one-way

ANOVAs on ranks and Wilcoxon rank sum tests (to examine pairwise differences) were

conducted, in order to explore differences in precautionary behaviors by major political party

affiliation, with each constituent item being analyzed individually, the results of which are

summarized in the tables below.

Precaution item	Kruskal-Wallis χ2	Kruskal-Wallis p-value	Republican-Democrat p-value	Republican-Independent p-value	Independent-Democrat p-value
Frequency of washing hands	9.87	.007	.015	.900	.015
Frequency of sanitizing hands	5.54	.063	.809	.070	.070
Frequency of disinfecting surfaces	4.72	.095	.388	.434	.096
Frequency of taking supplements intended to boost immune system	1.11	.574	.684	.878	.684
Effort spent on acquiring household disinfectants	7.01	.030	.113	.569	.043
Effort spent on acquiring soap and hand sanitizer	10.00	.007	.340	.089	.005

Effort spent on acquiring masks and gloves	15.3	4.66e-4	.002	.769	.004
Frequency of using mask	51.3	7.37e-12	9.95e-10	.479	3.74e-8
Frequency of using gloves	10.8	.005	.029	.657	.010
Frequency of staying farther than 6 feet from people in public	12.2	.002	.005	.496	.017
Extent to which lockdown rules were observed	24.7	4.31e-6	2.03e-5	.449	4.36e-4
Extent to which social distancing was observed in general	17.2	1.81e-4	1.38e-4	.122	.033

Table A1.07. Results of one-way ANOVAs on ranks and Wilcoxon rank sum tests testing individual precautionary behavior items by political party, Study 1. For the Wilcoxon pairwise comparisons, p-values have been adjusted for multiple comparisons using the Benjamini-Hochberg procedure.

Precaution item	Kruskal-Wallis χ2	Kruskal-Wallis p-value	Republican-Democrat p-value	Republican-Independent p-value	Independent-Democrat p-value
Frequency of washing hands	3.86	.145	.151	.373	.479
Frequency of sanitizing hands	4.74	.094	.332	.439	.105
Frequency of disinfecting surfaces	3.65	.161	.454	.454	.166
Frequency of taking supplements intended to boost immune system	.03	.987	.952	.952	952
Effort spent on acquiring household disinfectants	6.97	.031	.067	.797	.063
Effort spent on acquiring soap and hand sanitizer	9.45	.009	.020	.838	.020
Effort spent on acquiring masks and gloves	17.1	1.94e-4	.001	.609	.002
Frequency of using mask	65.4	6.27e-15	1.97e-15	2.75e-4	9.06e-5

Frequency of using gloves	6.38	.041	.070	.990	.070
Frequency of staying farther than 6 feet from people in public	5.48	.065	.053	.229	.514
Extent to which lockdown rules were observed	39.6	2.49e-9	1.93e-9	.017	5.70e-4
Extent to which social distancing was observed in general	37.2	8.15e-9	4.07e-9	2.18e-4	.059

Table A1.08. Results of one-way ANOVAs on ranks and Wilcoxon rank sum tests testing individual precautionary behavior items by political party, Study 2. For the Wilcoxon pairwise comparisons, p-values have been adjusted for multiple comparisons using the Benjamini-Hochberg procedure.

Although results varied somewhat between studies, compared to Republicans or Independents, Democrats generally reported washing their hands more; making a greater effort to acquire soap, hand sanitizer, masks, and gloves; using masks and gloves more in public; observing social distancing more stringently; and following lockdown orders more. The effects were strongest for mask wearing in particular, as well as social distancing, effort spent acquiring masks and gloves, and following lockdown orders. There generally were not strong differences between Democrats on the one hand, and either Republicans or Independents on the other, in the

use of supplements intended to boost the immune system, and the frequency with which surfaces were disinfected. Independents and Republicans did not systematically differ in mean precautions across both studies.

5. **Relationship between economic conservatism and pathogen disgust sensitivity**

In the main text, we speculate that among Republicans, concern for economic considerations may conflict with precautionary responses to COVID-19. Indeed, among Republicans, we found that economic conservatism negatively correlated with concerns about the health consequences of the pandemic, as well as with precautionary health behaviors (see Supporting Analyses). Given the relationship between pathogen disgust sensitivity and precautionary behaviors in response to COVID-19, we considered the possibility that economic conservatism may also negatively correlate with disgust, particularly among Republicans.
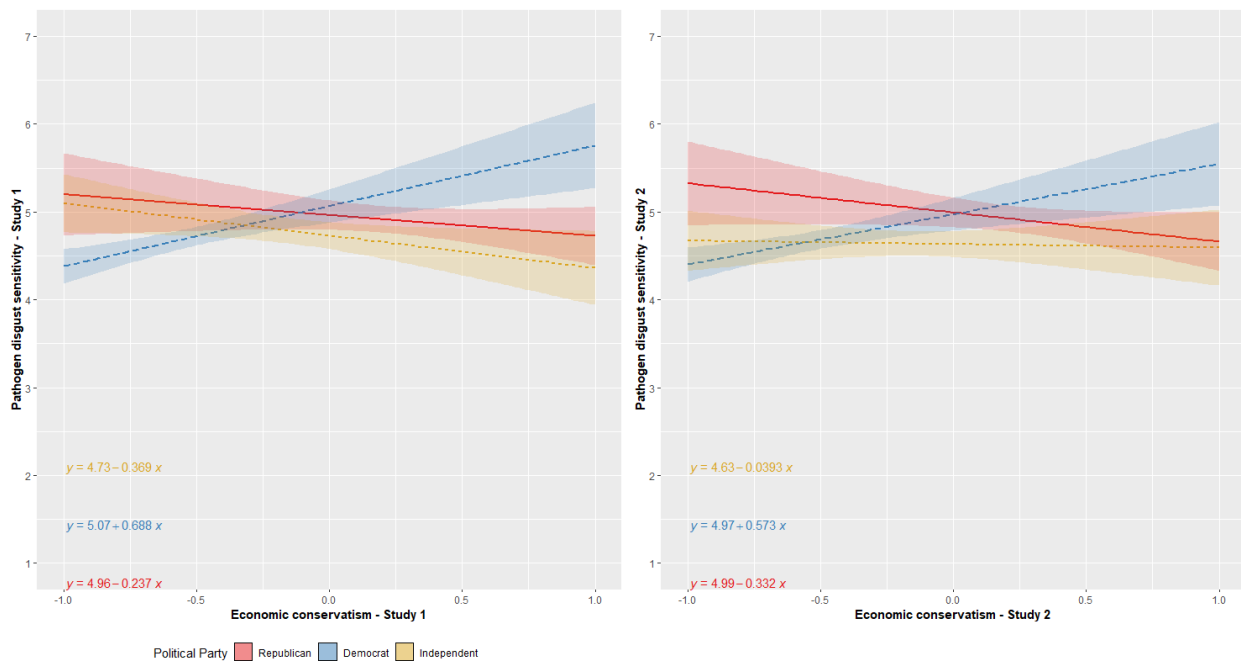
Figure A1.35. Studies 1 and 2 conditional effects of moderated linear regressions in which the (centered) pathogen disgust sensitivity composite was regressed on economic conservatism, political party affiliation, and the two-way interaction between party affiliation and economic conservatism. Bands around regression lines are 95% confidence intervals. On each plot,

regression equations indicate the conditional simple slopes relationships between pathogen disgust sensitivity and economic conservatism by political affiliation (slopes are unstandardized).

Results were somewhat conceptually similar to the party-specific relationships between economic conservatism and precautionary COVID-19 behaviors. Disgust positively correlated with economic conservatism among Democrats, consistent with the positive association between precautionary behaviors and economic conservatism among supporters of that party. However, among Independent and Republicans, economic conservatism did not consistently negatively correlate with pathogen disgust.

6. **Results without lockdown order item in COVID-19 health precautions composite**

In the main text analyses, the COVID-19 precautionary health behaviors composite included a large range of items intended to capture different categories of prophylactic behavior, including the extent to which participants were following local and state lockdown restrictions. Owing to the prominent role lockdowns have played in shaping behavioral responses to the pandemic, we believe that it was important to measure compliance with lockdown orders in the course of measuring precautionary behavior, hence its inclusion in the precautionary behaviors composite. However, while the other items in the precautions composite—such as engaging in hand washing and wearing masks—are consistently applicable across the United States, lockdown orders have varied widely both geographically, and over time. Therefore, the question of, "To what extent are you following your local and state lockdown restrictions?" did not have consistent meaning for participants both within and across studies. For example, following highly restrictive lockdown orders entails substantially different behavior compared to complying with looser rules. Because we did not ask what those lockdown restrictions were, we cannot measure what could plausibly be substantial variation between participants in the meaning of that item.

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In order to assuage concerns that this unmeasured variation may be influencing the reported results–especially in light of the fact that variation in lockdown orders has likely tracked along geographical lines that mirror political divisions–we repeated the main text analyses using a version of the precautionary COVID-19 behaviors composite that excluded the lockdown order item (this version of the scale was reliable: αs = .85). Excluding the lockdown order item had little effect on the conceptual outcomes of Studies 1 and 2, the general results of which were replicated with the lockdown-less precautions scale. Therefore, despite concerns about variation in meaning for this item between participants, its inclusion in the precautionary behaviors composite had little impact on the conclusions drawn from the results. The analyses without the lockdown item are reported below.

Does COVID-19 precautionary behavior differ by political party?

Examining Democrats, Republicans, and political Independents, there was a significant effect linking party affiliation to levels of precautionary behavior without the lockdown item in both studies (Study 1: $F[2, 860] = 11.27$, $p = 1.47e-5$Study 2: $F[2, 857] = 10.9$, $p = 2.12e-5$). Post hoc comparisons using the Tukey HSD test indicate that the mean precaution scores for Democrats (Study 1: M = 5.07, SD = 1.08; Study 2: M = 5.11, SD = 1.04) were significantly different than those for Republicans (Study 1: M = 4.71, SD = 1.31, p = 0.00111; Study 2: M = 4.7, SD = 1.31, p = 7.16e-5) and Independents (Study 1: M = 4.67, SD = 1.24, p = 1.02e-4; Study 2: M = 4.81, SD = 1.11, p = .003), but that precautions did not significantly differ between the latter two (Study 1: p = 0.901; Study 2: p = 0.606). These findings are fully consistent with the results reported in the main text.

Do socially conservative political attitudes predict precautionary behavior?

In both studies, the precautionary COVID-19 composite without the lockdown item correlated with socially conservative political attitudes among Democrats, but not Republicans or Independents. These findings are fully consistent with the main text results.
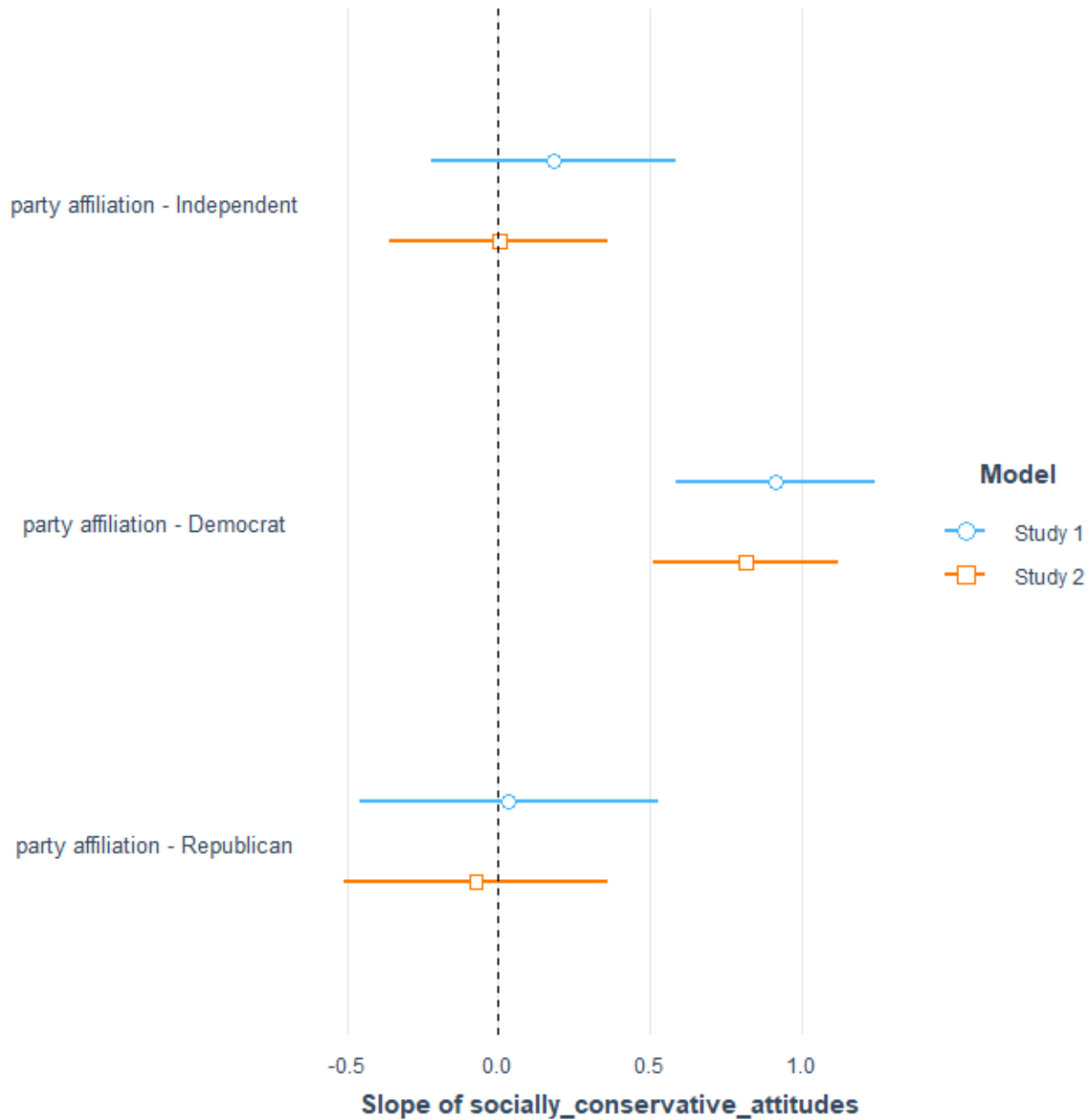
Figure A1.36. Studies 1 and 2 forest plot showing conditional effects (based on simple slopes analyses) of moderated linear regressions, in which COVID-19 precautionary behaviors (minus the lockdown item) was regressed on socially conservative attitudes, political party affiliation, and their two-way interaction. Plotted coefficients are unstandardized. Lines indicate 95% confidence intervals.

What drives partisan differences in the relationship between socially conservative political attitudes and COVID-19 precautions?

We tested whether the combined effects of economic conservatism, the trust in scientists composite, the trust in liberals and moderates composite, and the liberal media consumption composite jointly suppressed the relationship between socially conservative attitudes and the precautionary behaviors composite minus the lockdown item. First, the combined indirect effect of the four suppressors was negative and significant among Republicans and Independents in both studies (**Study 1** - Republicans: bootstrapped standardized indirect effect = -.16, 95% CI [-.23, -.09]; Independents: indirect effect = -.14, 95% CI [-.22, -.06]); **Study 2** - Republicans: bootstrapped standardized indirect effect = -.11, 95% CI [-.19, -.04]; Independents: indirect effect = -.27, 95% CI [-.36, -.18]), demonstrating suppression.

Second, the combined effects of the suppressors rendered the moderation of political party on the attitudes-precautions (minus lockdown item) relationship no longer significant between Democrats on the one hand, and either Republicans or Independents on the other (Democrat-Republican: βs = -.08 – -.01, ps = .140 – .899; Democrat-Independent: βs = -.01 – -.001, ps = .882 – .990).

Third, in Study 1, a simple slopes analysis reveals that, after including for the effects of the suppressors and their interactions with political party, there were significant conditional effects between socially conservative attitudes and the precautionary behaviors composite without the lockdown item among Democrats (β = 0.26, $t(820)$ = 4.14, p = 3.90e-5), Republicans (β = 0.24, $t(820)$ = 2.63, p = .009), and Independents (β = 0.24, $t(820)$ = 3.27, p = .001). In Study 2, there were conditional effects among Democrats (β = 0.28, $t(812)$ = 4.61, p = 4.65e-6) and Independents (β = 0.28, $t(812)$ = 3.66, p = 2.69e-4), but no significant effect among Republicans

($\beta = 0.13$, $t(812) = 1.64$, $p = .103$). These findings are partially consistent with the results reported in the text.

Further, the conceptual results of these models (significant and positive relationships between COVID-19 precautions and socially conservative attitudes among Democrats and Independents in both studies after accounting for the suppressors, but only in Study 1 among Republicans) were robust to the inclusions of the same demographic variables and other covariates (such as pathogen disgust sensitivity) described in the Main Text.
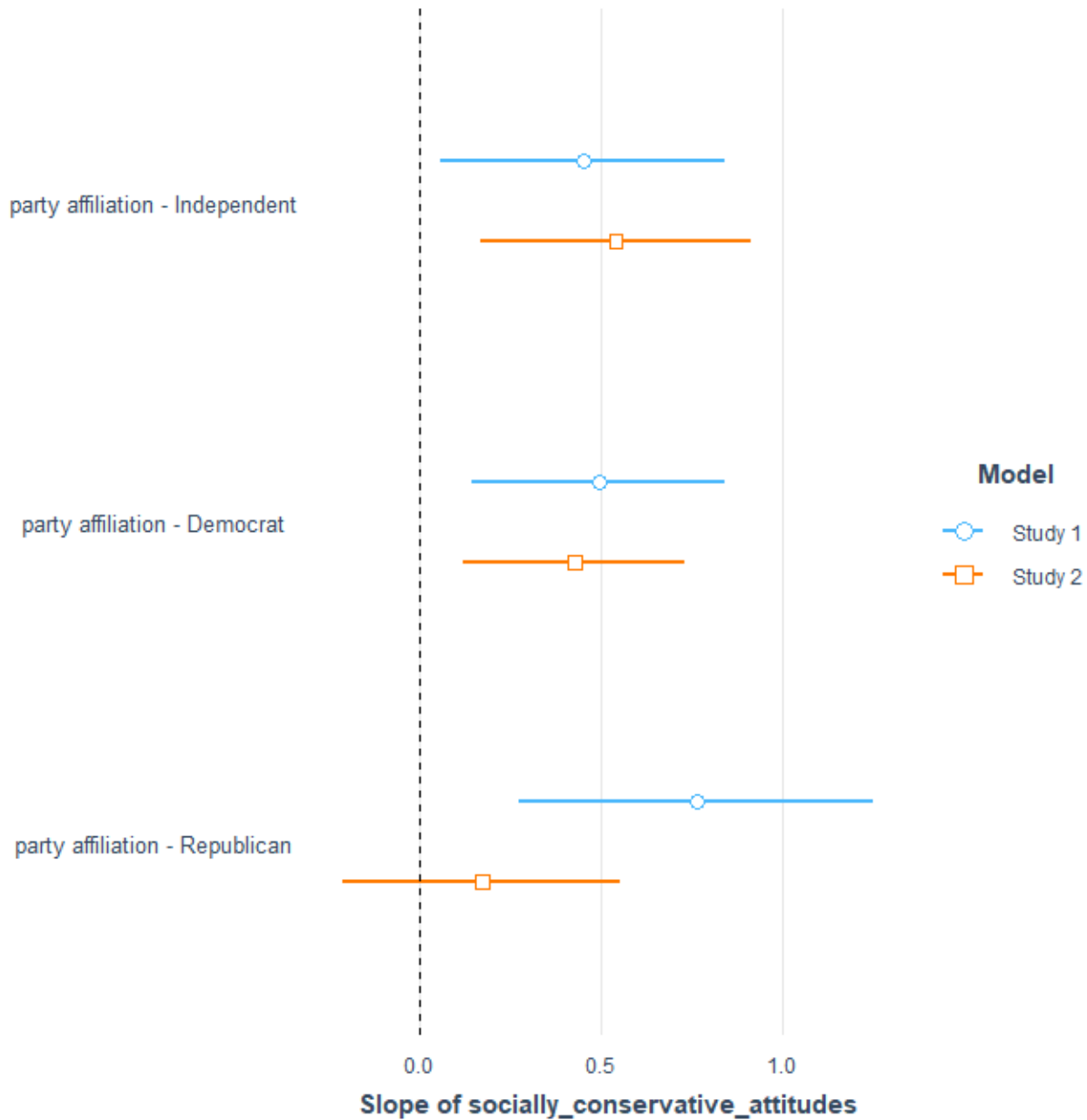
Figure A1.37. Studies 1 and 2 forest plot showing conditional effects (based on simple slopes analyses) of socially conservative attitudes on the COVID-19 precautions composite (minus the lockdown-related item) from moderated linear regressions. Additionally, these models include both the pre-identified suppressor variables, as well as a wide variety of covariates. These additional covariates were as follows: age, gender, ethnicity, income, education, pre-existing health conditions, self-reported density of local neighborhood, self-reported estimates of local COVID-19 prevalence, the extent to which one's job required leaving the household, and pathogen disgust sensitivity. Plotted coefficients are unstandardized. Lines indicate 95% confidence intervals.

Disgust sensitivity, politics, and precautionary COVID-19 behaviors

Using moderated linear regressions in which the version of the COVID-19 precautionary behaviors composite that excludes the lockdown item was regressed on pathogen disgust sensitivity, political party affiliation, and their two-way interaction, we found that disgust sensitivity was associated with precautionary behaviors among supporters of all three major political party affiliations (Bs = .22 − .42, ps = 3.07e-4 − 5.24e-11)

7. **Results separating social conservatism and traditionalism measures**

In the main text, we examined the relationship between socially conservative attitudes–which encompasses both specific policy preferences that emphasize social continuity, and general attitudes toward traditions—and precautionary COVID-19 health behaviors. That is, we combined into a single composite both specific social policy preferences (as measured by the social conservatism subscale of the issues index measure), and general attitudes toward social change (as measured by the traditionalism subscale of the Aggression-Submission-Conventionalism scale, which measures the concepts of right-wing authoritarianism using more politically and religiously neutral language). This was useful, given that preferences for social change versus social continuity ramify across many different domains, and combining beliefs regarding different aspects of support for traditions captures a broader slice of the phenomenon of interest.

However, it is also of interest to understand how pathogen-avoidant precautionary behaviors individually relate to different components of socially conservative attitudes writ large. For example, is the relationship between specific social policy preferences and precautionary COVID-19 behaviors conceptually isomorphic with the relationship between general traditionalism attitudes and prophylaxis? Or, do these two facets of socially conservative

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attitudes relate differently to precautionary behavior? Here, we repeat the analyses found in the main text, but instead of using the combined socially conservative attitudes composite as a single independent variable, we separate out its two constituent parts: social conservatism (i.e., specific policy preferences toward social change), and traditionalism (i.e., general attitudes toward social change).

In sum, these results suggest that, when parceled out, social conservatism and traditionalism associate similarly, with precautionary behaviors. This points to both the theoretical cohesiveness between these measures–preferences for traditional political policies on the one hand, and positive attitudes toward traditions in general on the other–as well as the practical utility in combining these measures into the socially conservative attitudes composite found in the main text analyses. That the analyses using the combined measure, and the analyses separating out the two individual measures, largely conceptually converge constitutes an importance robusticity check of the main findings.

Do social conservatism and traditionalism predict precautionary behavior?

In both studies, social conservatism and traditionalism separately correlated with precautionary COVID-19 behaviors among Democrats, but not Republicans or Independents (see Figure A1.38). These results are consistent with the main text, and suggest that at least for these simple effects, both social conservatism and traditionalism are associating similarly with precautionary behavior.

Figure A1.38. Studies 1 and 2 forest plots showing conditional effects (based on simple slopes analyses) of moderated linear regressions, in which COVID-19 precautionary behaviors was regressed separately on either traditionalism (left pane) or social conservatism (right pane), political party affiliation, and the two-way interaction between party affiliation and the particular ideology variable. Plotted coefficients are unstandardized. Lines indicate 95% confidence intervals.

What drives partisan differences in the relationship between socially conservative political attitudes and COVID-19 precautions?

We then tested whether the combined effects of economic conservatism, the trust in scientists composite, the trust in liberals and moderates composite, and the liberal media consumption composite jointly suppressed the relationship between either traditionalism or social conservatism separately, and the precautionary behaviors composite. First, in Study 1, the combined indirect effect of the four suppressors was negative and significant among Republicans and Independents when using either social conservatism or traditionalism as the independent variable of interest (**social conservatism** - Republicans: bootstrapped standardized indirect effect = -.15, 95% CI [-.22, -.08]; Independents: indirect effect = -.12, 95% CI [-.21, -.04]); **traditionalism** - Republicans: bootstrapped standardized indirect effect = -.10, 95% CI [-.19, -.03]; Independents: indirect effect = -.11, 95% CI [-.19, -.04]), demonstrating suppression. In Study 2, the indirect effect was negative and significant among Independents for both social conservatism and traditionalism (social conservatism: bootstrapped standardized indirect effect = -.27, 95% CI [-.38, -.17]; traditionalism: indirect effect = -.20, 95% CI [-.28, -.12]). Among Republicans, the indirect effect was significant for traditionalism, but only marginal for social conservatism (social conservatism: bootstrapped standardized indirect effect = -.07, 95% CI [-.15, 0]; traditionalism: indirect effect = -.12, 95% CI [-.21, -.04]).

Second, in Study 1, the combined effects of the suppressors rendered the moderation of political party on relationships between precautionary behaviors and either social conservatism or traditionalism no longer significant between Democrats on the one hand, and either Republicans or Independents on the other (Democrat-Republican: βs = -.07 – .03, ps = .232 – .571; Democrat-Independent: βs = -.02 – -.002, ps = .673 – .965). In Study 2, the slope of the

relationship between either social conservatism or traditionalism, and precautionary behaviors, did not significantly differ between Democrats and Independents (βs = -.04 – .04, ps = .326 – .433). However, while there was no significant difference in slopes between Democrats and Republicans when considering traditionalism (β = -.04, p = .452), there was a marginally significant difference for the social conservatism-precautions relationship (β = -.09, p = .079)

Third, in Study 1, simple slopes analyses revealed that, after including the effects of the suppressors and their interactions with political party, there were significant conditional effects between either social conservatism or traditionalism and the precautionary behaviors composite among Democrats (social conservatism: β = 0.27, t(820) = 3.95, p = 8.37e-5; traditionalism: β = 0.15, t(819) = 2.86, p = .004), Republicans(social conservatism: β = 0.15, t(820) = 2.08, p = .038; traditionalism: β = 0.21, t(819) = 2.21, p = .027), and Independents (social conservatism: β = 0.23, t(820) = 3.25, p = .001; traditionalism: β = 0.15, t(819) = 2.05, p = .041). In Study 2, there were conditional effects among Democrats (social conservatism: β = 0.31, t(812) = 5.12, p = 3.91e-7; traditionalism: β = 0.13, t(812) = 2.56, p = .011) and Independents (social conservatism: β = 0.23, t(812) = 3.20, p = .001; traditionalism: β = 0.22, t(812) = 3.09, p = .002), while among Republicans, the conditional effect was significant with social conservatism (β = 0.15, t(812) = 2.23, p = .026), and was non-significant with traditionalism (β = 0.06, t(812) = .65, p = .513).

In sum, while these results are largely consistent with the analyses presented in the main text—suggesting that the identified suppressors are acting on both social conservatism and traditionalism—the above results for Study 2 indicate that among Republicans, the effect on the relationship between traditionalism and precautionary behaviors is weaker compared to their effect on the social conservatism-precautions association.

However, after accounting for the effects of the demographic variables and other covariates described in the Main Text, the relationship between traditionalism and COVID-19 precautions was no longer significant among Democrats in either Studies 1 or 2, among Independents in Study 1, and among Republicans in Study 2. However, conceptually similar to the results using the overall socially conservative attitudes composite and described in the Main Text, the addition of these covariates did not attenuate the relationship between social conservatism and COVID-19 precautions in either study among Democrats and Independents, or in Study 1 among Republicans. These results suggest that the relationship between social conservatism and precautions is more robust to the inclusion of the added covariates compared to the traditionalism-precautions relationships.

Figure A1.39. Studies 1 and 2 forest plot showing conditional effects (based on simple slopes analyses) of either traditionalism (left pane) or social conservatism (right pane) on the COVID-19 precautions composite from moderated linear regressions. Additionally, these models include both the pre-identified suppressor variables, as well as a wide variety of covariates. These additional covariates were as follows: age, gender, ethnicity, income, education, pre-existing health conditions, self-reported density of local neighborhood, self-reported estimates of local COVID-19 prevalence, the extent to which one's job required leaving the household, and pathogen disgust sensitivity. Plotted coefficients are unstandardized. Lines indicate 95% confidence intervals.

Disgust sensitivity, politics, and precautionary COVID-19 behaviors

Consistent with the main text analyses, in both studies, pathogen disgust sensitivity correlated with both traditionalism and social conservatism among Democrats, whereas those relationships did not obtain among Republicans. Among Independents, neither traditionalism or social conservatism associated with disgust sensitivity in Study 1, but in Study 2, social conservatism was positively correlated with disgust, while disgust's relationship with traditionalism approached significance. These results are consistent with the analyses presented in the main text.

Figure A1.40. Studies 1 and 2 forest plot showing conditional effects (based on simple slopes analyses) of moderated linear regressions, in which pathogen disgust sensitivity was regressed separately on either traditionalism (left pane) or social conservatism (right pane), political party affiliation, and the two-way interaction between party affiliation and the particular ideology variable. Plotted coefficients are unstandardized. Lines indicate 95% confidence intervals.

8. **Effects of perceived closeness to preferred political party affiliation**

Mirroring public polling (Pew Research Center, 2020), our data indicate that Republicans and Democrats are responding to the COVID-19 outbreak differently, with Republicans considering the direct health threats posed by the pandemic as less serious relative to Democrats. However, such overarching patterns obscure expectable heterogeneity in the extent to which party affiliation reflects broader aspects of an individual's self-concept and identity. We therefore considered the possibility that perceived closeness to one's preferred political party might relate to COVID-19 precautionary behaviors along party-specific lines. That is, in light of increased skepticism toward the pandemic, the degree of perceived closeness with the Republican party could negatively correlate with precautions, whereas closeness with the Democrat party may positively correlate with prophylaxis. Participants were asked four questions about how closely they identified with their preferred political party affiliation, (e.g., "I identify with other members of the ___ party"). These items were drawn from a social identification scale (Ellemers et al., 1999), and the identity fusion scale (Gómez et al., 2011). We averaged these items into a reliable composite (αs = .89 – .90).

Contrary to the above conjecture, in Study 1, among Republicans, perceived degree of closeness with the Republican party positively correlated with precautions; however, this relationship did not obtain in Study 2. Perceived degree of closeness positively associated with precautions among Independents in both Studies, and among Democrats in Study 2, but not Study 1. Because of the lack of consistent replication between Studies 1 and 2, it would be inappropriate to draw any firm conclusions from these findings.
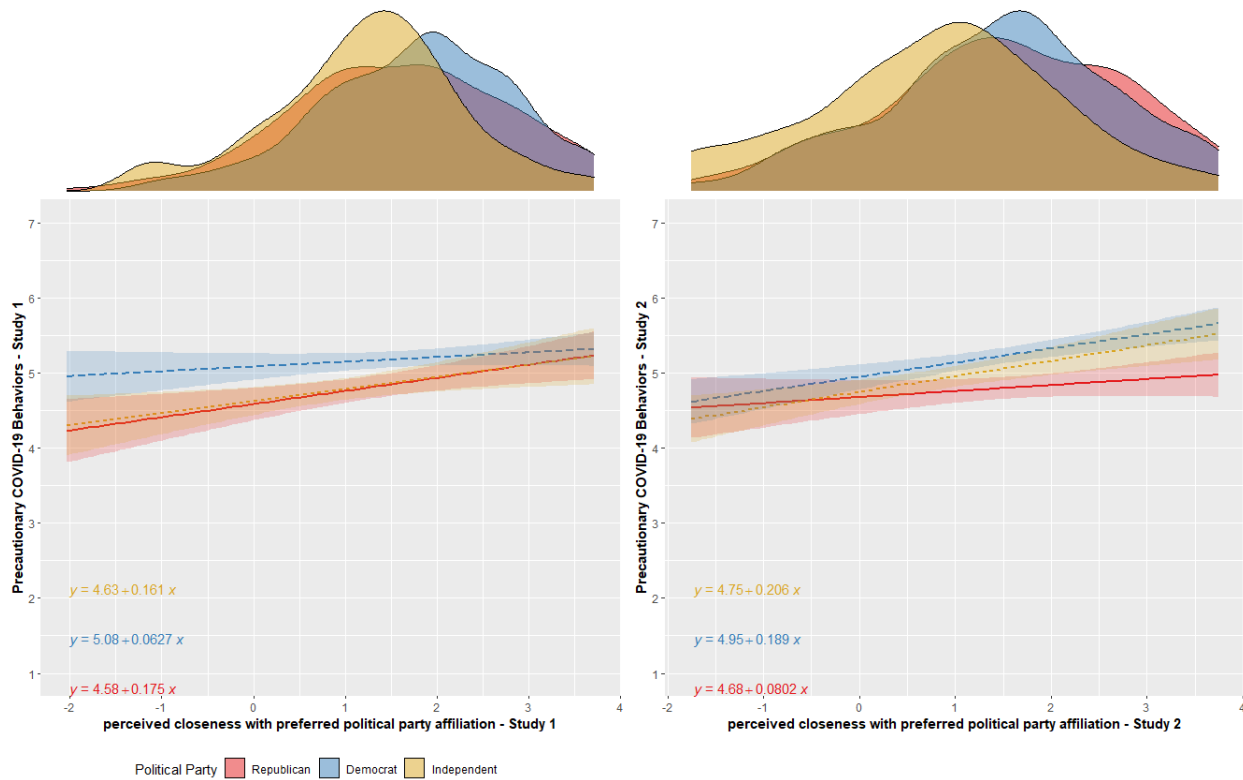
Figure A1.41. Studies 1 and 2 conditional effects of moderated linear regressions in which precautionary COVID-19 behaviors were regressed on perceived closeness with one's own preferred political party affiliation, political party affiliation, and their two-way interaction. Bands around regression lines are 95% confidence intervals. On each plot, regression equations indicate the conditional simple slopes relationships between COVID-19 precautions and perceived closeness with preferred political party affiliation by political affiliation (the perceived closeness composite measure has been z-scored, hence slopes are standardized).

9. **Effects of time on the relationship between political party affiliation and COVID-19 precautions**

In the Pilot Study, there was no significant difference between Democrats and Republicans in mean COVID-19 precautions (see S2 Appendix), whereas in Studies 1 and 2, Democrats reported slightly more COVID-19 precautions than did Republicans (see Main Text). As an exploratory analysis, we considered the possibility that, as time progressed, the pandemic became increasingly politicized, potentially resulting in Republicans taking fewer precautions

relative to Democrats. Because the Pilot Study and Studies 1 and 2 were conducted several months apart (April 17th, May 29th, and July 11th, 2020, respectively), we tested whether partisan differences in COVID-19 precautions increased over time across the three studies.

In order to test this possibility, a two-way ANOVA was conducted pooling participants from all three studies that examined the effect of time (three time points, corresponding to each of the three studies) and political party affiliation (only Democrats and Republicans, because Independents were not included in the Pilot Study) on COVID-19 precautions. Note that we used the COVID-19 precautionary behaviors composite from the Pilot Study in order to compare across all three studies, because some items from the COVID-19 precautionary behaviors composite used in Studies 1 and 2 were not included in the Pilot Study. The main effect of time was not statistically significant ($F[1, 1597] = .05$, $p = .950$), nor was the interaction between time and political party affiliation ($F[1, 1597] = 1.52$, $p = .219$), see Figure *A1.42*. These results are not consistent with the hypothesis that increasing politicization resulted in a greater difference in COVID-19 precautions between Democrats and Republicans over the period examined.

Anova, $F_{(2,1597)} = 1.52$, $p = 0.22$, $\eta_g^2 = 0.002$
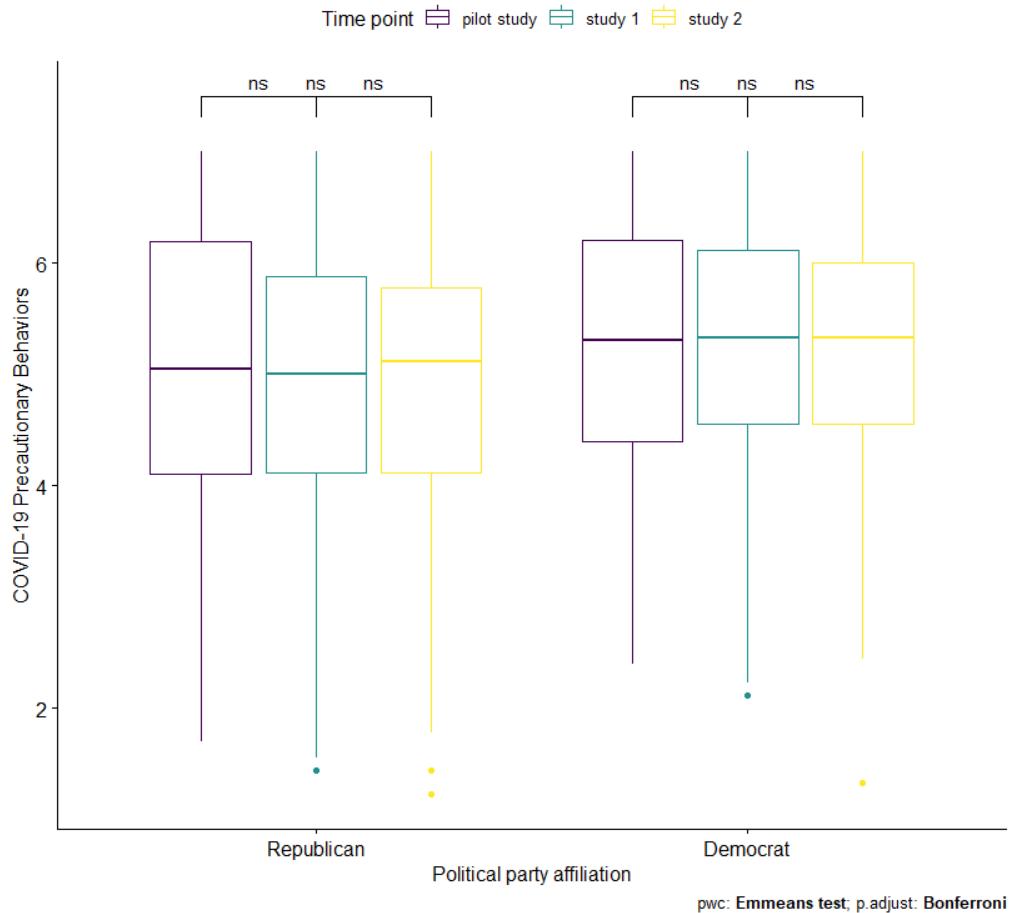
Figure A1.42. Results of two-way ANOVA examining the effects of time and political party affiliation on COVID-19 precautions. Note that among both Democrats and Republicans, self-reported COVID-19 precautions did not increase across the three time points (spanning from April to July 2020). Pairwise simple effects were obtained using estimated marginal means, and p-values were adjusted using the Bonferroni method.

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APPENDIX 2

Chapter 2 Supplementary Materials

Supplementary Procedure

1. Composite scales and other variables

Full survey items in English can be found in the open archives, as well as all translations.

COVID-19 Public Health Precautions Composite: Composite of both external- and internal-facing precautions.

Note that although the following item—"When you leave your home and may be near other people, how often do you… wear gloves"—was included as a precaution item in the survey, it did not load onto either factor, and therefore was not included in any composite.

Internal-facing precautions:

> Compared to before the pandemic, how important has it been for you to have adequate supplies of... [1 – not at all important … 7 – extremely important]

1. Cleaning supplies (such as bleach, disinfectant spray, disinfectant wipes, etc.)
2. Hand sanitizer/hand soap
3. Masks and gloves

> Compared to before the pandemic, how important has been for you to… [1 – not at all important … 7 – extremely important]

1. Clean your hands with soap or sanitizer
2. Disinfect surfaces in your house, like doorknobs or counters
3. Eat or drink things to boost your immune system

> When you leave your home and may be near other people, how often do you each of the following? [1 – never … 7 – as often as possible]

1. Disinfect surfaces upon returning home

External-facing precautions:

When you leave your home and may be near other people, how often do you each of the following? [1 – never … 7 – as often as possible]

1. Wear a mask and/or face shield/visor
2. Stay farther than 2 meters/6 feet away from people [*note: unit of distance varied according to local norms*]

To what degree were you careful in the last week to avoid interaction with people outside your household? [1 – not careful at all … 7 – as careful as possible]

In your daily life, how important is it that you take actions that protect yourself and others from COVID-19? [1 – not at all important … 7 – extremely important]

Compared to before the pandemic, I have changed many aspects of my everyday behavior to protect myself and others from COVID-19 [1 – strongly disagree … 7 – strongly agree]

Religious precautions:

How often do you engage in… [1 – never … 7 – very frequently]

1. Individual religious behavior such as prayer (for example praying alone) to protect yourself and others from COVID-19
2. Collective religious behavior such as attending a church/synagogue/mosque/temple/shrine to protect yourself and others from COVID-19

Conventionalism: From the Aggression-Submission-Conventionalism scale[1], a measure of right-wing authoritarianism.

The following questions concern values that people may or may not hold. Please select a number to indicate the degree to which you agree or disagree with each statement. [1 – strongly disagree … 7 – strongly agree]

3. People emphasize tradition too much. (r)
4. It would be better for society if more people followed social norms.
5. People should respect social norms.
6. Traditions are the foundation of a healthy society and should be respected.
7. Traditions interfere with progress. (r)
8. People should challenge social traditions in order to advance society. (r)

Moral Foundations authority subscale: Short-form measure[2].

When you decide whether something is right or wrong, to what extent are the following considerations relevant to your thinking? Please rate each statement using this scale: [1 – not at all relevant … 7 – extremely relevant]

1. Whether or not someone showed a lack of respect for authority
2. Whether or not someone conformed to the traditions of society

Please read the following sentences and indicate your agreement or disagreement [1 – strongly disagree … 7 – strongly agree]

1. Men and women each have different roles to play in society.
2. Respect for authority is something all children need to learn.

Traditionalism Factor: Items derived from Conventionalism and Moral Foundations authority subscales.

1. It would be better for society if more people followed social norms (see anchors above).
2. People should respect social norms (see anchors above).
3. Traditions are the foundation of a healthy society and should be respected. (see anchors above).
4. Whether or not someone showed a lack of respect for authority (see anchors above).
5. Whether or not someone conformed to the traditions of society (see anchors above).
6. Respect for authority is something all children need to learn (see anchors above).

Social dominance orientation composite: Four-item Short Social Dominance Orientation Scale[3]

There are many types of groups in the world: men and women, ethnic and religious groups, nationalities, political factions, etc. Please select a number to rate the degree to which you oppose or favor each statement about groups, where higher numbers mean you favor the statement more, and lower numbers mean you oppose the statement more. [1 – extremely oppose … 7 – extremely favor]

1. In setting priorities, we must consider all groups. (r)
2. We should not push for group equality.
7. Group equality should be our ideal. (r)
8. Superior groups should dominate inferior groups.

Single item suppressor variables:

1. Distrust in scientists:
    How much do you think scientists provide advice based on accurate information about what to do during the COVID-19 outbreak? [1 – not at all accurate … 7 – extremely accurate]

2. Concern over the effects of COVID-19 on the economy:

   How concerned are you about the economic effects of the COVID-19 pandemic? [1 – not at all concerned … 7 – extremely concerned]

3. Concern over the effects of COVID-19 on personal liberties:

   How concerned are you about losing personal rights because of the COVID-19 pandemic? [1 – not at all concerned … 7 – extremely concerned]

4. Perceived tradeoffs between the COVID-19 pandemic and personal rights

   The public health benefits of policies addressing the COVID-19 pandemic are not worth the potential costs to personal rights [1 – strongly disagree … 7 – strongly agree]

5. Perceived tradeoffs between the COVID-19 pandemic and the economy

   The public health benefits of policies addressing the COVID-19 pandemic are not worth the potential costs to the economy [1 – strongly disagree … 7 – strongly agree]

6. Perceived tradeoffs between the COVID-19 pandemic and practicing traditions

   Following my traditional cultural practices is more important than following public health recommendations about COVID-19 when those guidelines interfere with my traditional cultural practices [1 – strongly disagree … 7 – strongly agree]

COVID-19-relevant covariates:

1. Perceived COVID-19 prevalence:

   In your opinion, how prevalent is COVID-19 in your local community? [1 – not at all prevalent … 7 – extremely prevalent]

2. Population density:

   How would you best describe the area where you live?

   - Large city
   - Small city
   - Town or suburb
   - Village or countryside

3. Job requirements:

   If applicable, does your job currently require that you leave the home?

   - Always required to leave the home
   - Sometimes required to leave the home

- Rarely required to leave the home
- Never required to leave the home
- I don't have a job

4. Health conditions:

Has a doctor or other health professional ever diagnosed you with any of the

following health conditions?

- Autoimmune disease
- Weak immune system
- Diabetes
- High blood pressure
- Heart disease
- Asthma
- Kidney disease

Demographic variables and attention checks:

1. Gender (some response options differed across study sites, see OSF repository for details):

What is your gender identity?

- Woman
- Man
- Other

2. Education (Response options differed across study sites based on local education systems. For the purposes of analysis, those response options were binned into the following four categories. see OSF repository for details):

Your highest level of education completed?

- Primary school
- Secondary school
- Undergraduate level
- Advanced/post-graduate level

3. Age:

What is your age in years?

4. Relative wealth:

Compared to other people in your country, how would you describe your

wealth? [1 – much less wealthy than most other people in my country … 7 –

much wealthier than most other people in my country]

5. Attention check 1:

When you look up on a clear day, what color is the sky?

- Train station

- Laptop
- Blue
- Cardboard box
- Chicken
- Green
- Book
- Lamp

6. Attention check 2:

Did you carefully consider your responses to this survey (please be honest)?

- Yes
- No

2. Differences between pre-registration and final manuscript

There are several differences between the pre-registered measures and those reported in the main text and supplement. Here, we explain those differences.

- *Survey items reserved for separate projects:* We included a number of measures in the surveys that are not reported in the main text because they are being reserved for separate projects. In addition to listing these reserved variables below, they can also be found in the full surveys in the open archive.

  Reserved measures:

  1. COVID-19 religious precautions subscale (see items above)
  2. Pathogen disgust sensitivity scale[4]
  3. Belief in a dangerous world scale[5]
  4. Generalized social trust item (not included at every study site)
  5. Social conservatism item (not included at every study site)
  6. Economic conservatism item (not included at every study site)
  7. Belief in a deity/deities (not included at every study site)
  8. Various measures that were included at individual study sites only (see study-site specific full surveys in open archive for details).
  9. Parental status
- *Unincluded study sites*: In addition to the 27 countries included in the manuscript, we pre-registered that we would collect data in the following additional countries: Russia, Brazil, Colombia, Egypt, and Armenia. However, these countries were not included in the final sample for a variety of unanticipated circumstances. In Armenia, Brazil, and Russia, data collection never began due to extenuating circumstances. In Egypt and Colombia, data collection began, but we were unable to recruit more than 60 participants in either country after exclusion criteria were applied. Therefore, they were excluded from the study, and the existing underpowered data was never analyzed in any way. We

specified in the pre-registration that study sites may be excluded on the basis of insufficient participant recruitment.

- *COVID-19 infection status:* Participants were asked whether they were currently known to be infected with COVID-19. We intended to use this as a covariate with the other COVID-19-related covariates in relevant meta-analyses. However, at some study sites, no participants reported being infected with COVID-19. Therefore, it was dropped from analysis.

3. Analysis software

We used R[6], RStudio[7], and the R-packages devtools[8], ggplot2[9], GPArotation , gridExtra[10], interactions[11], kableExtra[12], lavaan[13], lme4[14], lmerTest[15], MASS[16], Matrix[17], mediation[18], metafor[19], mvtnorm[20,21], parameters[22], psych[23], report[24], sandwich[25,26], scales[27], sjPlot[28], and tidyverse[29] for our analyses. The code that produced all analyses in the main text and supplement is openly available at: https://osf.io/6vu5b/?view_only=873259d429c346d2912303fc44df5079.

4. Software version and source information

- Session info --

version R version 4.1.1 (2021-08-10)

os   Windows 10 x64 (build 19043)

system   x86_64, mingw32

ui   RStudio

language (EN)

collate English_United States.1252

ctype   English_United States.1252

date   2022-06-18

rstudio 2021.09.0+351 Ghost Orchid (desktop)

pandoc   2.14.0.3 @ C:/Program Files/RStudio/bin/pandoc/ (via rmarkdown)

- Packages (attached & loaded via a namespace) ---

package   * version   date (UTC) lib source

assertthat   0.2.1   2019-03-21 [1] CRAN (R 4.1.1)

backports   1.3.0   2021-10-27 [1] CRAN (R 4.1.1)

base   * 4.1.1   2021-08-10 [?] local

base64enc   0.1-3   2015-07-28 [1] CRAN (R 4.1.1)

bayestestR   0.11.5   2021-10-30 [1] CRAN (R 4.1.2)

boot   1.3-28   2021-05-03 [2] CRAN (R 4.1.1)

brio   1.1.3   2021-11-30 [1] CRAN (R 4.1.3)

broom   0.7.9   2021-07-27 [1] CRAN (R 4.1.1)

bslib   0.3.1   2021-10-06 [1] CRAN (R 4.1.2)

cachem   1.0.6   2021-08-19 [1] CRAN (R 4.1.2)

callr   3.7.0   2021-04-20 [1] CRAN (R 4.1.1)

cellranger   1.1.0   2016-07-27 [1] CRAN (R 4.1.1)

checkmate   2.0.0   2020-02-06 [1] CRAN (R 4.1.1)

cli   3.3.0   2022-04-25 [1] CRAN (R 4.1.3)

cluster   2.1.2   2021-04-17 [2] CRAN (R 4.1.1)

coda   0.19-4   2020-09-30 [1] CRAN (R 4.1.2)

colorspace   2.0-2   2021-06-24 [1] CRAN (R 4.1.1)

compiler   4.1.1   2021-08-10 [2] local

crayon   1.4.1   2021-02-08 [1] CRAN (R 4.1.1)

data.table   1.14.2   2021-09-27 [1] CRAN (R 4.1.1)

datasets   * 4.1.1   2021-08-10 [2] local

datawizard   0.2.3   2022-01-26 [1] CRAN (R 4.1.1)

DBI   1.1.1   2021-01-15 [1] CRAN (R 4.1.1)

dbplyr   2.1.1   2021-04-06 [1] CRAN (R 4.1.1)

desc   1.4.0   2021-09-28 [1] CRAN (R 4.1.2)

devtools   * 2.4.3   2021-11-30 [1] CRAN (R 4.1.3)

digest   0.6.28   2021-09-23 [1] CRAN (R 4.1.1)

dplyr   * 1.0.7   2021-06-18 [1] CRAN (R 4.1.1)

effectsize   0.6.0.1   2022-01-26 [1] CRAN (R 4.1.1)

ellipsis   0.3.2   2021-04-29 [1] CRAN (R 4.1.1)

emmeans   1.7.2   2022-01-04 [1] CRAN (R 4.1.2)

estimability 1.3   2018-02-11 [1] CRAN (R 4.1.1)

evaluate   0.14   2019-05-28 [1] CRAN (R 4.1.1)

fansi   0.5.0   2021-05-25 [1] CRAN (R 4.1.1)

fastmap   1.1.0   2021-01-25 [1] CRAN (R 4.1.1)

forcats   * 0.5.1   2021-01-27 [1] CRAN (R 4.1.1)

foreign   0.8-81   2020-12-22 [2] CRAN (R 4.1.1)

Formula   1.2-4   2020-10-16 [1] CRAN (R 4.1.1)

fs   1.5.0   2020-07-31 [1] CRAN (R 4.1.1)

generics   0.1.1   2021-10-25 [1] CRAN (R 4.1.1)

ggeffects   1.1.1   2021-07-29 [1] CRAN (R 4.1.2)

ggplot2   * 3.3.5   2021-06-25 [1] CRAN (R 4.1.1)

glue   1.6.2   2022-02-24 [1] CRAN (R 4.1.3)

graphics   * 4.1.1   2021-08-10 [2] local

grDevices   * 4.1.1   2021-08-10 [2] local

grid   4.1.1   2021-08-10 [2] local

gridExtra   * 2.3   2017-09-09 [1] CRAN (R 4.1.1)

gtable   0.3.0   2019-03-25 [1] CRAN (R 4.1.1)

haven   2.4.3   2021-08-04 [1] CRAN (R 4.1.1)

highr   0.9   2021-04-16 [1] CRAN (R 4.1.1)

Hmisc   4.6-0   2021-10-07 [1] CRAN (R 4.1.1)

hms   1.1.1   2021-09-26 [1] CRAN (R 4.1.1)

htmlTable   2.3.0   2021-10-12 [1] CRAN (R 4.1.1)

htmltools   0.5.2   2021-08-25 [1] CRAN (R 4.1.1)

htmlwidgets   1.5.4   2021-09-08 [1] CRAN (R 4.1.1)

httr   1.4.2   2020-07-20 [1] CRAN (R 4.1.1)

insight   0.15.0   2022-01-07 [1] CRAN (R 4.1.2)

interactions * 1.1.5   2021-07-02 [1] CRAN (R 4.1.2)

jpeg   0.1-9   2021-07-24 [1] CRAN (R 4.1.1)

jquerylib   0.1.4   2021-04-26 [1] CRAN (R 4.1.1)

jsonlite   1.7.2   2020-12-09 [1] CRAN (R 4.1.1)

jtools   2.1.4   2021-09-03 [1] CRAN (R 4.1.2)

kableExtra   * 1.3.4   2021-02-20 [1] CRAN (R 4.1.1)

knitr   1.36   2021-09-29 [1] CRAN (R 4.1.1)

lattice   0.20-44   2021-05-02 [2] CRAN (R 4.1.1)

latticeExtra   0.6-29   2019-12-19 [1] CRAN (R 4.1.1)

lavaan   * 0.6-9   2021-06-27 [1] CRAN (R 4.1.1)

lifecycle   1.0.1   2021-09-24 [1] CRAN (R 4.1.1)

lme4   * 1.1-27.1   2021-06-22 [1] CRAN (R 4.1.1)

lmerTest   * 3.1-3   2020-10-23 [1] CRAN (R 4.1.2)

lpSolve   5.6.15   2020-01-24 [1] CRAN (R 4.1.1)

lubridate   1.8.0   2021-10-07 [1] CRAN (R 4.1.1)

magrittr   2.0.1   2020-11-17 [1] CRAN (R 4.1.1)

MASS   * 7.3-54   2021-05-03 [2] CRAN (R 4.1.1)

mathjaxr   1.4-0   2021-03-01 [1] CRAN (R 4.1.2)

Matrix   * 1.3-4   2021-06-01 [2] CRAN (R 4.1.1)

mediation   * 4.5.0   2019-10-08 [1] CRAN (R 4.1.1)

memoise   2.0.1   2021-11-26 [1] CRAN (R 4.1.3)

metafor   * 3.0-2   2021-06-09 [1] CRAN (R 4.1.2)

methods   * 4.1.1   2021-08-10 [2] local

minqa   1.2.4   2014-10-09 [1] CRAN (R 4.1.1)

mnormt   2.0.2   2020-09-01 [1] CRAN (R 4.1.1)

modelr   0.1.8   2020-05-19 [1] CRAN (R 4.1.1)

munsell   0.5.0   2018-06-12 [1] CRAN (R 4.1.1)

mvtnorm   * 1.1-3   2021-10-08 [1] CRAN (R 4.1.1)

nlme   3.1-152   2021-02-04 [2] CRAN (R 4.1.1)

nloptr   1.2.2.2   2020-07-02 [1] CRAN (R 4.1.1)

nnet   7.3-16   2021-05-03 [2] CRAN (R 4.1.1)

numDeriv   2016.8-1.1 2019-06-06 [1] CRAN (R 4.1.1)

pander   0.6.4   2021-06-13 [1] CRAN (R 4.1.2)

parallel   4.1.1   2021-08-10 [2] local

parameters   * 0.16.0   2022-01-12 [1] CRAN (R 4.1.2)

pbivnorm   0.6.0   2015-01-23 [1] CRAN (R 4.1.1)

performance   0.8.0   2021-10-01 [1] CRAN (R 4.1.2)

pillar   1.6.4   2021-10-18 [1] CRAN (R 4.1.1)

pkgbuild   1.3.1   2021-12-20 [1] CRAN (R 4.1.2)

pkgconfig   2.0.3   2019-09-22 [1] CRAN (R 4.1.1)

pkgload   1.2.4   2021-11-30 [1] CRAN (R 4.1.3)

png   0.1-7   2013-12-03 [1] CRAN (R 4.1.1)

prettyunits   1.1.1   2020-01-24 [1] CRAN (R 4.1.1)

processx   3.5.2   2021-04-30 [1] CRAN (R 4.1.1)

ps   1.6.0   2021-02-28 [1] CRAN (R 4.1.1)

psych   * 2.1.9   2021-09-22 [1] CRAN (R 4.1.1)

purrr   * 0.3.4   2020-04-17 [1] CRAN (R 4.1.1)

R6   2.5.1   2021-08-19 [1] CRAN (R 4.1.1)

RColorBrewer   1.1-2   2014-12-07 [1] CRAN (R 4.1.1)

Rcpp   1.0.7   2021-07-07 [1] CRAN (R 4.1.1)

readr   * 2.0.2   2021-09-27 [1] CRAN (R 4.1.1)

readxl   1.3.1   2019-03-13 [1] CRAN (R 4.1.1)

remotes   2.4.2   2021-11-30 [1] CRAN (R 4.1.3)

report   * 0.4.0   2021-09-30 [1] CRAN (R 4.1.2)

reprex   2.0.1   2021-08-05 [1] CRAN (R 4.1.1)

rlang   1.0.2   2022-03-04 [1] CRAN (R 4.1.3)

rmarkdown   2.11   2021-09-14 [1] CRAN (R 4.1.1)

rpart   4.1-15   2019-04-12 [2] CRAN (R 4.1.1)

rprojroot   2.0.2   2020-11-15 [1] CRAN (R 4.1.2)

rstudioapi   0.13   2020-11-12 [1] CRAN (R 4.1.1)

rvest   1.0.2   2021-10-16 [1] CRAN (R 4.1.1)

sandwich   * 3.0-1   2021-05-18 [1] CRAN (R 4.1.1)

sass   0.4.0   2021-05-12 [1] CRAN (R 4.1.2)

scales   1.1.1   2020-05-11 [1] CRAN (R 4.1.1)

sessioninfo   1.2.2   2021-12-06 [1] CRAN (R 4.1.3)

sjlabelled   1.1.8   2021-05-11 [1] CRAN (R 4.1.2)

sjmisc   2.8.9   2021-12-03 [1] CRAN (R 4.1.2)

sjPlot   * 2.8.10   2021-11-26 [1] CRAN (R 4.1.2)

sjstats   0.18.1   2021-01-09 [1] CRAN (R 4.1.2)

splines   4.1.1   2021-08-10 [2] local

stats   * 4.1.1   2021-08-10 [2] local

stats4   4.1.1   2021-08-10 [2] local

stringi   1.7.5   2021-10-04 [1] CRAN (R 4.1.1)

stringr   * 1.4.0   2019-02-10 [1] CRAN (R 4.1.1)

survival   3.2-11   2021-04-26 [2] CRAN (R 4.1.1)

svglite   2.0.0   2021-02-20 [1] CRAN (R 4.1.1)

systemfonts   1.0.3   2021-10-13 [1] CRAN (R 4.1.1)

testthat   3.1.4   2022-04-26 [1] CRAN (R 4.1.3)

tibble   * 3.1.5   2021-09-30 [1] CRAN (R 4.1.1)

tidyr   * 1.1.4   2021-09-27 [1] CRAN (R 4.1.1)

tidyselect   1.1.1   2021-04-30 [1] CRAN (R 4.1.1)

tidyverse   * 1.3.1   2021-04-15 [1] CRAN (R 4.1.1)

tmvnsim   1.0-2   2016-12-15 [1] CRAN (R 4.1.1)

tools   4.1.1   2021-08-10 [2] local

tzdb   0.1.2   2021-07-20 [1] CRAN (R 4.1.1)

usethis   * 2.1.6   2022-05-25 [1] CRAN (R 4.1.3)

```
 utf8        1.2.2    2021-07-24 [1] CRAN (R 4.1.1)
utils      * 4.1.1    2021-08-10 [2] local
 vctrs       0.3.8    2021-04-29 [1] CRAN (R 4.1.1)
 viridisLite  0.4.0    2021-04-13 [1] CRAN (R 4.1.1)
 webshot     0.5.2    2019-11-22 [1] CRAN (R 4.1.1)
 withr       2.5.0    2022-03-03 [1] CRAN (R 4.1.3)
 xfun        0.27     2021-10-18 [1] CRAN (R 4.1.1)
 xml2        1.3.2    2020-04-23 [1] CRAN (R 4.1.1)
 xtable      1.8-4    2019-04-21 [1] CRAN (R 4.1.2)
 yaml        2.2.1    2020-02-01 [1] CRAN (R 4.1.1)
 zoo         1.8-9    2021-03-09 [1] CRAN (R 4.1.1)
```

Map of Study Sites

Figure A2.01. Map of countries (purple pins) that were included in the study. See a list of study sites in Table **A2.03**. This map was created by the authors using www.mapcustomizer.com.

Analyses Supporting Main Text

1. Traditionalism-precautions correlations and density distributions by study site

In the caption for Figure 2 in the main text, we noted that study-site-specific labeled regression plots and density distribution plots for traditionalism and COVID-19 health precautions could be found in the Supplement. Here, we provide those plots (Figures A2.02-A2.04).
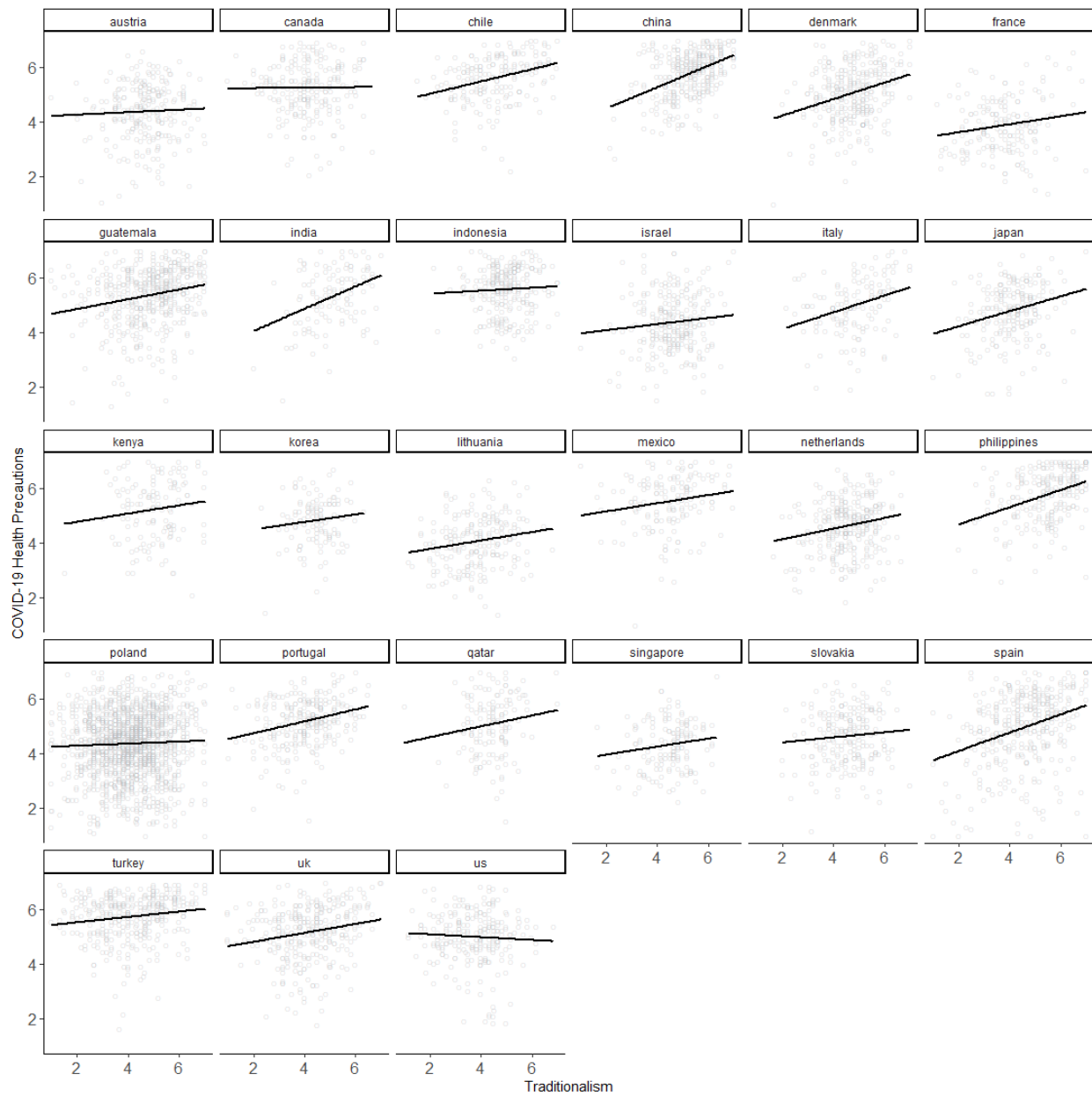
Figure A2.02. Regression lines plotting zero-order correlations between traditionalism and COVID-19 health precautions at each study site individually. Beans show raw data points. Compare to Figure 2 in the main text.
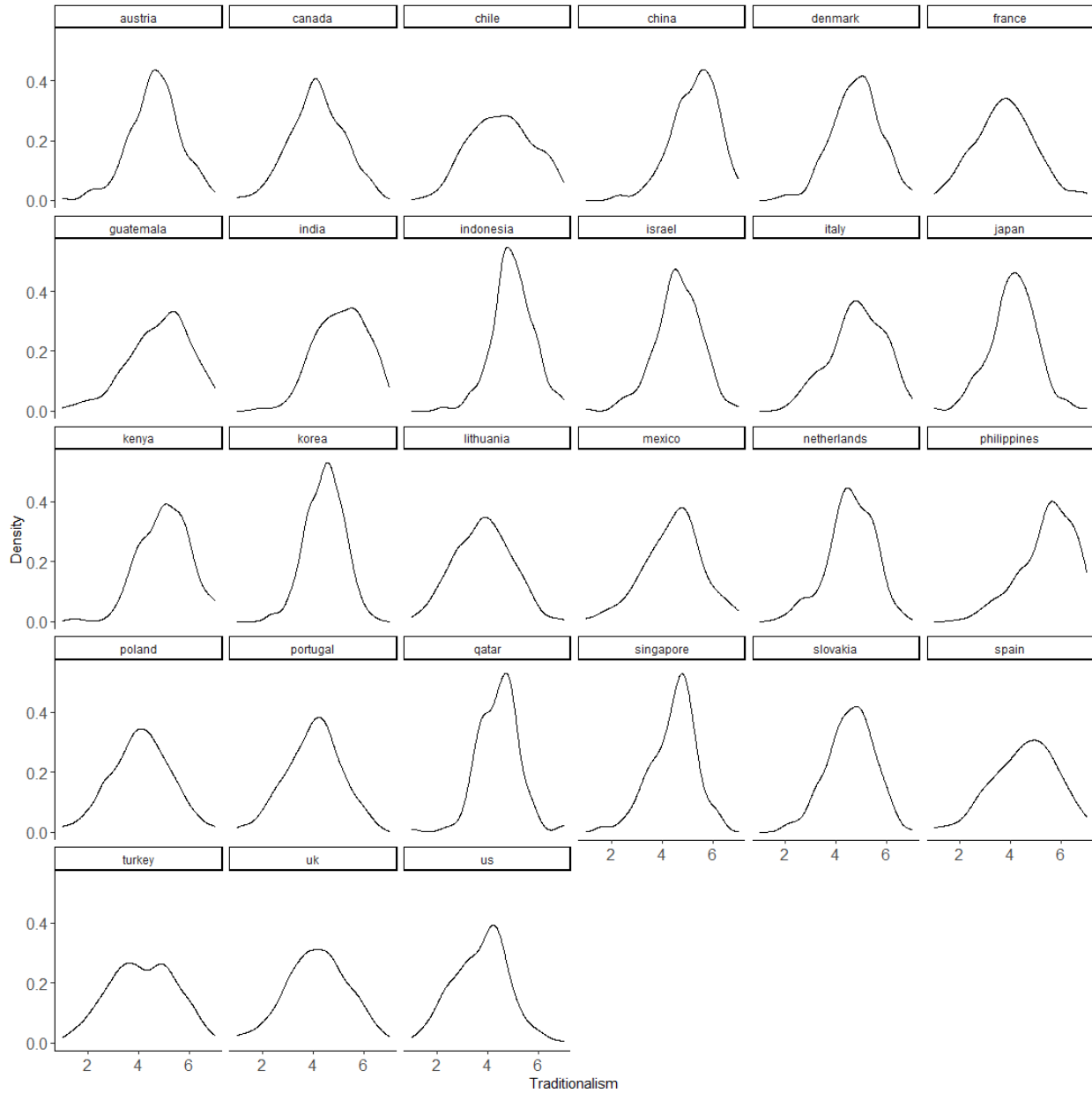
Figure A2.03. Raw density distributions of traditionalism composite across each study site individually. Compare to Figure 2 in the main text.
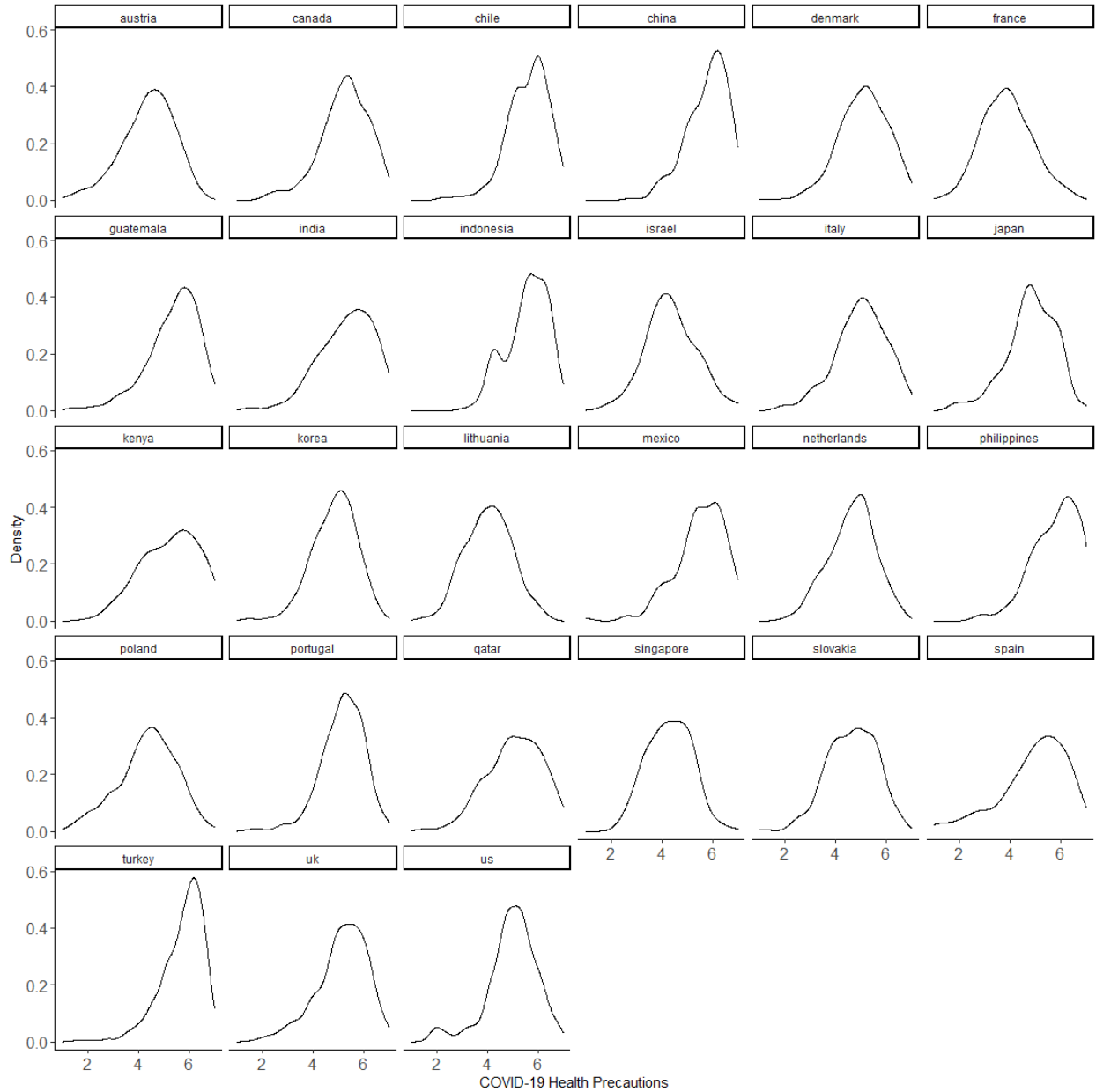
Figure A2.04. Raw density distributions of COVID-19 health precautions composite across each study site individually. Compare to Figure 2 in the main text.

2. Traditionalism-precautions relationship adjusting for covariates

In the main text, we noted that the bivariate correlation between COVID-19 health precautions and traditionalism is robust to the inclusion of the following demographic controls and COVID-19 related covariates: age; gender; education; relative income, perceived COVID

prevalence in participants' local communities; the population density of those communities; whether participants' jobs required that they leave home; and whether participants had certain pre-existing medical conditions that may put them at higher risk for severe disease. To test this, we conducted a random-effects, restricted maximum likelihood meta-analysis in which each study site was treated as a separate sample. We examined the semi-partial correlation between traditionalism and health precautions after adjusting for the effects of those seven variables in multiple linear regressions where health precautions were regressed on traditionalism and the seven covariates. Covariates were identical across study sites. As seen in Figure A2.5, adjusting for these demographic and COVID-related controls did not conceptually change the results.

Study Site		Correlation [95% CI]
United States		3.81% -0.10 [-0.22, 0.01]
France		3.44% -0.00 [-0.14, 0.14]
Indonesia		3.77% 0.02 [-0.09, 0.14]
Austria		3.61% 0.03 [-0.10, 0.15]
Slovakia		3.73% 0.04 [-0.08, 0.16]
Poland		4.62% 0.05 [-0.00, 0.10]
Canada		3.72% 0.06 [-0.06, 0.17]
Qatar		3.10% 0.06 [-0.11, 0.22]
Israel		3.81% 0.10 [-0.02, 0.21]
South Korea		3.09% 0.10 [-0.06, 0.27]
Singapore		3.35% 0.12 [-0.03, 0.26]
Turkey		4.03% 0.12 [0.03, 0.22]
Kenya		3.12% 0.13 [-0.03, 0.29]
Netherlands		3.94% 0.15 [0.04, 0.25]
Mexico		3.13% 0.15 [-0.01, 0.31]
U.K.		4.05% 0.15 [0.06, 0.25]
Lithuania		3.58% 0.16 [0.04, 0.29]
Guatemala		4.23% 0.16 [0.08, 0.25]
Japan		3.59% 0.20 [0.08, 0.33]
Spain		4.13% 0.23 [0.14, 0.32]
Italy		3.32% 0.27 [0.13, 0.42]
Denmark		4.08% 0.28 [0.19, 0.37]
Portugal		3.89% 0.29 [0.18, 0.39]
Chile		3.73% 0.29 [0.17, 0.41]
Philippines		3.73% 0.32 [0.20, 0.44]
India		3.26% 0.36 [0.21, 0.50]
China		4.15% 0.42 [0.33, 0.51]
RE Model		100.00% 0.15 [0.11, 0.20]

-0.4   -0.2   0   0.2   0.4   0.6

Semi-Partial Correlation Coefficient

Figure A2.05. Results of random-effects meta-analysis examining the relationship between traditionalism and COVID-19 health precautions after adjusting for demographic variables and COVID-relevant covariates. See Figure 1 in the main text for a description of how to interpret the forest plot.

We also noted in the main text that the same set of demographic and COVID-related covariates did not conceptually change the precautions-traditionalism relationship after adjusting for the effects of the identified suppressor variables. To test this, we ran a meta-analysis similar to the one conducted for Figure A2.5, however this time also including the five suppressor variables as covariates in the regression models. As seen in Figure A2.6, adjusting for these demographic and COVID-related controls did not conceptually change the results.

Study Site		Correlation [95% CI]
Indonesia	3.61%	0.02 [-0.09, 0.14]
Qatar	2.61%	0.04 [-0.12, 0.20]
United States	4.23%	0.04 [-0.05, 0.14]
Kenya	2.59%	0.07 [-0.09, 0.23]
Slovakia	3.70%	0.07 [-0.04, 0.18]
Israel	3.84%	0.08 [-0.03, 0.18]
France	3.24%	0.08 [-0.05, 0.21]
Canada	3.69%	0.09 [-0.03, 0.20]
Austria	3.89%	0.09 [-0.02, 0.19]
Singapore	2.95%	0.09 [-0.05, 0.23]
South Korea	1.97%	0.12 [-0.07, 0.31]
Turkey	4.30%	0.12 [0.03, 0.22]
Japan	3.30%	0.14 [0.01, 0.27]
Poland	5.84%	0.16 [0.11, 0.21]
U.K.	4.37%	0.18 [0.09, 0.27]
Guatemala	4.85%	0.18 [0.10, 0.26]
Mexico	2.82%	0.19 [0.04, 0.33]
Netherlands	4.18%	0.20 [0.10, 0.29]
Denmark	4.41%	0.20 [0.11, 0.29]
Lithuania	3.49%	0.20 [0.08, 0.32]
India	2.73%	0.22 [0.07, 0.37]
Spain	4.69%	0.27 [0.18, 0.35]
Chile	3.60%	0.28 [0.16, 0.39]
Philippines	3.59%	0.28 [0.16, 0.39]
Italy	3.00%	0.28 [0.14, 0.42]
China	4.41%	0.28 [0.19, 0.37]
Portugal	4.10%	0.30 [0.21, 0.40]
RE Model	100.00%	0.16 [0.13, 0.19]

Figure A2.06. Results of random-effects meta-analysis examining the relationship between traditionalism and COVID-19 health precautions after adjusting for suppressor variables, as well as demographic variables and COVID-relevant covariates. See Figure 1 in the main text for a description of how to interpret the forest plot.

3. Precautions-traditionalism relationship disattenuated for unreliability

Given variation in scale reliability across study sites (see Table A2.8), we conducted meta-analyses on the traditionalism-precautions relationship that disattenuated for unreliability. In the main text, we noted that disattenuating for unreliability did not conceptually affect the results. First, we conducted a meta-analysis on the zero-order correlation between traditionalism and COVID-19 health precautions that disattenuated for unreliability; results are shown in Figure A2.7.
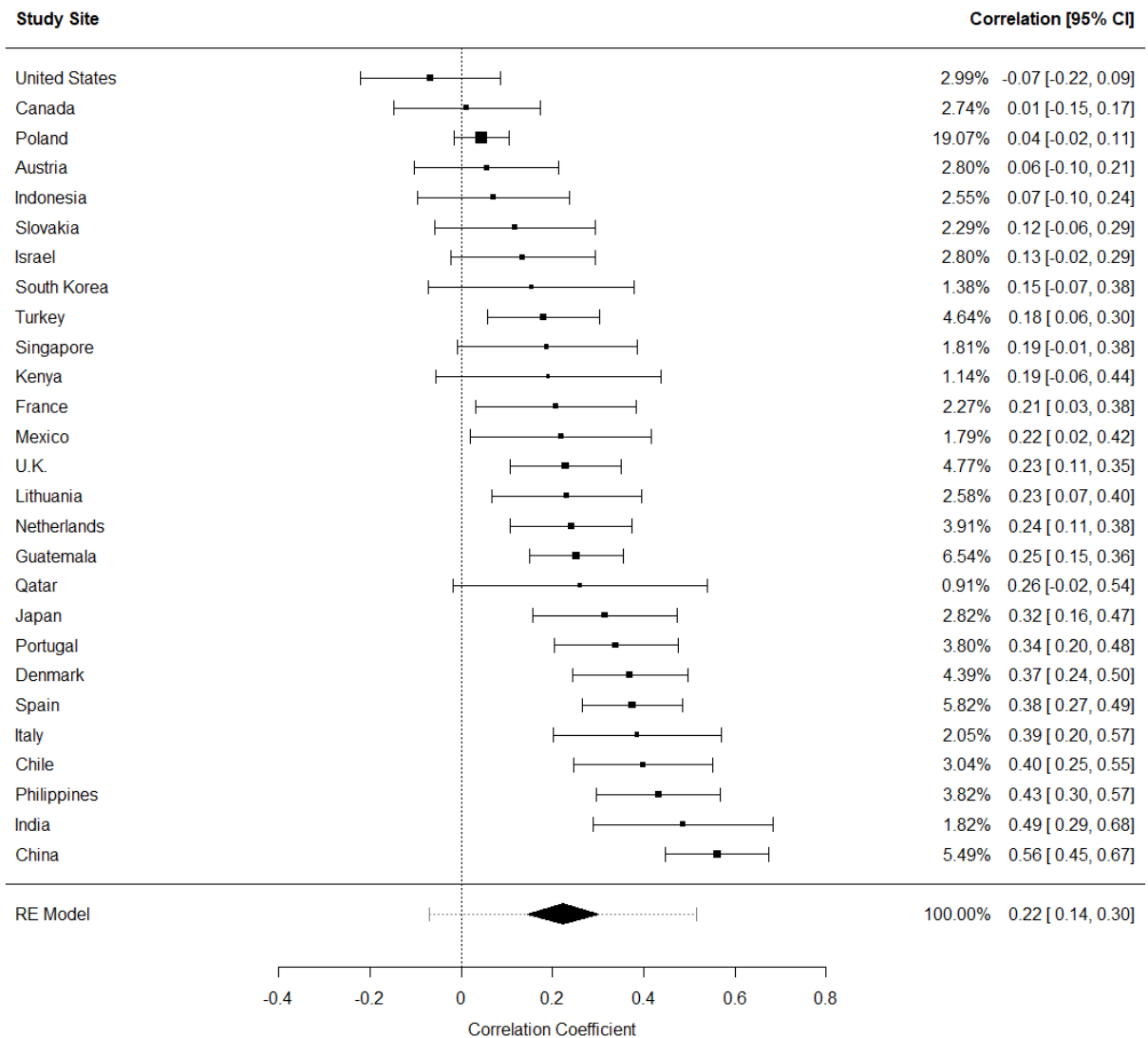
Figure A2.07. Results of random-effects meta-analysis examining the relationship between traditionalism and COVID-19 health precautions after disattenuating for scale unreliability across study sites. See Figure 1 in the main text for a description of how to interpret the forest plot.

Second, we conducted a meta-analysis examining the semi-partial correlation between COVID-19 health precautions and traditionalism after adjusting for the effects of the five suppressor variables, while also disattenuating for scale unreliability (see Figure A2.8). In both cases, findings reported in the main text were not conceptually changed by disattenuating for unreliability.

Study Site		Correlation [95% CI]
Indonesia		2.24% 0.07 [-0.09, 0.24]
Israel		2.68% 0.08 [-0.07, 0.23]
Canada		2.76% 0.10 [-0.05, 0.24]
Kenya		1.05% 0.10 [-0.14, 0.34]
United States		4.18% 0.15 [0.02, 0.27]
Singapore		1.68% 0.17 [-0.02, 0.36]
Austria		3.79% 0.17 [0.04, 0.30]
Slovakia		2.34% 0.18 [0.02, 0.34]
Turkey		4.49% 0.20 [0.08, 0.32]
Poland		19.12% 0.20 [0.15, 0.26]
Qatar		0.85% 0.22 [-0.05, 0.49]
Japan		2.63% 0.23 [0.08, 0.38]
Mexico		1.79% 0.27 [0.08, 0.45]
Lithuania		2.66% 0.27 [0.12, 0.42]
Guatemala		6.91% 0.27 [0.18, 0.37]
U.K.		4.84% 0.28 [0.16, 0.39]
Denmark		4.17% 0.28 [0.16, 0.40]
France		2.26% 0.29 [0.12, 0.45]
Netherlands		4.04% 0.30 [0.18, 0.43]
South Korea		0.87% 0.33 [0.06, 0.59]
India		1.51% 0.33 [0.13, 0.53]
Portugal		3.74% 0.36 [0.23, 0.49]
China		4.53% 0.36 [0.25, 0.48]
Italy		2.22% 0.37 [0.20, 0.53]
Philippines		3.29% 0.38 [0.25, 0.52]
Spain		6.40% 0.39 [0.29, 0.49]
Chile		2.93% 0.41 [0.27, 0.55]
RE Model		100.00% 0.25 [0.21, 0.29]

Semi-Partial Correlation Coefficient

Figure A2.08. Results of random-effects meta-analysis examining the relationship between traditionalism and COVID-19 health precautions after adjusting for the five suppressor variables, and disattenuating for scale unreliability across study sites. See Figure 1 in the main text for a description of how to interpret the forest plot.

4. Effects of COVID-19 prevalence on study estimates of traditionalism-precautions relationship

In the main text, we noted that country-specific rates of COVID-19 prevalence did not explain any meaningful variance in effect sizes between study sites. To test this, we conducted two meta-regressions using two different measures of national COVID-19 prevalence. First, we calculated national average daily confirmed cases per million people over the specific period of data collection at each study site, obtained from Our World in Data[30]. Second, we calculated national total cumulative cases per million people since the start of the pandemic at the end of the specific period of data collection at each study site, obtained from the same source. For both meta-regressions, we tested whether the two COVID-19 prevalence metrics moderated the zero-order correlation between traditionalism and COVID-19 health precautions, and thus whether they accounted for any of the variance in heterogeneity in effect sizes across study sites. Neither average daily cases ($QM = .51$, $p = .474$, $R^2 = .00$) nor cumulative cases ($QM = 1.67$, $p = .198$, $R^2 = .04$) moderated the precautions-traditionalism relationship.

5. Identifying suppressor variables

The study included seven variables (see Methods section in main text for details) that were tested for possible suppressive effects on the health precautions-traditionalism relationship. As stated in the main text, we conducted mediation analyses to test for suppression across the pooled sample, where suppression was indicated by the presence of negative indirect effects (in contrast to the positive indirect effects that characterize mediation). See the Results section in the main text for further details on the statistical procedure. In the main text, we stated that we identified five suppressor variables in the pooled sample using this procedure, shown here in Table A2.1.

Suppressor Candidate	Indirect effect	Lower 95% CI	Upper 95% CI
SDO	-.018	-.022	-.013
Trust in scientists	-.015	-.023	-.008
Concern over economy	.009	.006	.012
Concern over personal liberties	.000	-.001	.001
Liberties-public health tradeoffs	-.014	-.017	-.010
Economy-public health tradeoffs	-.022	-.027	-.018
Traditions-public health tradeoffs	-.037	-.043	-.031

Table A2.01. Results of mediation analyses testing for suppression of the precautions-traditionalism relationship using a pooled sample across all 27 study sites. Each of the seven candidates were tested separately, and five variables were identified as suppressors. Note that coefficients are unstandardized betas (all seven candidate variables were measured on 1-to-7 Likert-type scales).

Next, we assessed the combined suppressive effects of the five variables at each study site individually, in order to understand whether those suppressors were acting in some socio-political contexts but not others. To test for the combined effects of the suppressors, all five variables were simultaneously entered in an individual mediation analysis for each study site using the R package *lavaan*[13]. As seen in Table A2.2, the effects of the suppressor variables varied substantially across study sites. Indeed, at two of the study sites, the combined effects of those five variables actually resulted in partial mediation—not suppression—of the health precautions-traditionalism relationship.

country	Bootstrapped indirect effect	Lower 95% CI	Upper 95% CI
Poland	-0.17	-0.21	-0.13
US	-0.17	-0.26	-0.09
Austria	-0.10	-0.18	-0.01
France	-0.07	-0.15	0.00
Canada	-0.07	-0.15	-0.01
Netherlands	-0.06	-0.11	0.00
UK	-0.05	-0.09	0.00
Slovakia	-0.05	-0.13	0.03
Chile	-0.03	-0.08	0.03
Spain	-0.03	-0.10	0.04
Lithuania	-0.03	-0.08	0.02
Portugal	-0.02	-0.06	0.02
Italy	-0.01	-0.09	0.06
Guatemala	-0.01	-0.04	0.03
Turkey	-0.01	-0.05	0.02
Indonesia	-0.01	-0.05	0.03
Mexico	0.00	-0.06	0.06
South Korea	0.00	-0.13	0.10
Singapore	0.01	-0.07	0.09
Philippines	0.03	-0.01	0.09
Qatar	0.03	-0.06	0.14
Israel	0.04	-0.02	0.11
Kenya	0.05	-0.05	0.15
Denmark	0.07	0.02	0.14
Japan	0.08	-0.02	0.17
China	0.11	0.07	0.16
India	0.11	0.00	0.21

Table A2.02. Results of mediation analyses testing for the combined effects of the five suppressors on the health precautions-traditionalism relationship at each of the 27 study sites.

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6. Precautions subscale interaction adjusting for covariates, suppressor variables, and planning items

In the main text, we report that the interaction between traditionalism and external-versus-internal precautions subscale (see Figure 4) was robust to the inclusion of the seven previously used demographic and COVID-19-related covariates, as well as the five suppressor variables. Here, we report those results.

When controlling for the demographic and COVID-19-related covariates, there was an interaction between health precautions subscale and traditionalism ($B = .15$, $SE = .01$, $t(7,274) = 12.39$, $p < .001$). A simple slopes analysis revealed that the correlation between traditionalism and internal-facing precautions ($B = .27$, $SE = .01$, $t(7,274) = 21.66$, $p < .001$) was about twice as strong as the correlation between traditionalism and external-facing precautions ($B = .11$, $SE = .01$, $t(7,274) = 9.24$, $p < .001$).

When controlling for the five suppressor variables, there was an interaction between health precautions subscale and traditionalism ($B = .16$, $SE = .01$, $t(7,122) = 12.50$, $p < .001$). A simple slopes analysis revealed that the correlation between traditionalism and internal-facing precautions ($B = .33$, $SE = .01$, $t(7,122) = 26.95$, $p < .001$) was about twice as strong as the correlation between traditionalism and external-facing precautions ($B = .17$, $SE = .01$, $t(7,122) = 14.11$, $p < .001$).

Finally, when controlling for both the suppressor and demographic variables, there was an interaction between health precautions subscale and traditionalism ($B = .16$, $SE = .01$, $t(6,882) = 12.26$, $p < .001$). A simple slopes analysis revealed that the correlation between traditionalism and internal-facing precautions ($B = .30$, $SE = .01$, $t(6,882) = 24.73$, $p < .001$) was about twice as strong as the correlation between traditionalism and external-facing precautions ($B = .14$, $SE = .01$, $t(6,882) = 11.82$, $p < .001$).

In addition, in the main text, we report that the interaction between health precautions subscale and traditionalism does not appear to be confounded by the fact that the internal-facing precautions subscale has more items concerning planning precautions compared to the external-facing precautions (thus providing a plausible alternative framing to the distinction between the two subscales that is driving the reported interaction). To address this possibility, we computed a modified internal-facing precautions composite that excluded all planning-related precautions (we removed the first three items listed under the internal-facing precautions header, see page S2). We then re-conducted the analyses reported in Figure 4 in the main text, however using the modified internal-facing precautions composite in place of the full composite. Using the planning-less composite did not conceptually affect the results, suggesting that the interaction is not being driven by differences between planning versus non-planning precautions. Specifically, there was an interaction between health precautions subscale and traditionalism ($B = .18$, $SE = .01$, $t(7,535) = 13.96$, $p < .001$). A simple slopes analysis revealed that the correlation between traditionalism and planning-less internal-facing precautions ($B = .32$, $SE = .01$, $t(7,535) = 24.66$, $p < .001$) was about twice as strong as the correlation between traditionalism and external-facing precautions ($B = .14$, $SE = .01$, $t(7,535) = 10.69$, $p < .001$).

7. Summary statistics and other information by study site

Table A2.3, below, presents a list of study sites, study-site specific Ns, as well as information on survey languages, recruitment procedures, and participant demographics for each study site. In the main text we report excluding participants on the basis of minimum completeness and correct answers to attention checks. Across all the study sites, 11,983 participants at least started the survey. We excluded 4,139 participants based on the above criteria, to arrive at a final sample size of 7,844. This relatively high attrition rate is unsurprising given that, at a majority of study sites, participants were uncompensated volunteers.

Study Site	Survey Language	Population	Recruitment Method	Compensation	N	Mean (SD) Age	% Women	Mean (SD) Traditionalism Factor Composite	Mean (SD) COVID-19 Health Precautions Composite	Average daily confirmed COVID-19 cases per million people over data collection period
Austria	German	Students; general population	Social media; classrooms	Volunteer	244	34.69 (13.28)	84	4.64 (1.00)	4.38 (1.04)	205.84
Canada	English	Students	Subject pools	Course credit	221	19.34 (2.40)	77	4.16 (1.04)	5.25 (.96)	109.18
Chile	Spanish	Students; general population	Social media; classrooms	Volunteer	195	31.91 (12.71)	67	4.56 (1.21)	5.61 (.83)	359.77
China	Mandarin Chinese	General population	Online workers (Weidiaocha)	CNY ¥6	317	25.27 (6.21)	55	5.30 (.91)	5.78 (.81)	.02
Denmark	Danish	General population	Online workers (YouGov)	75 YouGov points	307	50.11 (18.23)	50	4.77 (.96)	5.07 (.97)	233.77
France	French	Students; general population	Social media; classrooms	Volunteer	176	29.80 (13.29)	66	3.78 (1.18)	3.88 (.99)	52.18
Guatemala	Spanish	General population	Social media	Volunteer	457	39.65 (12.67)	80	4.83 (1.22)	5.36 (1.03)	41.00
India	English	Students	Classrooms	Volunteer	118	28.33 (9.01)	62	5.12 (.99)	5.33 (1.06)	8.60
Indonesia	Indonesian	Students; general population	Classrooms; social media	Volunteer	257	31.10 (9.97)	76	5.00 (.80)	5.57 (.82)	32.02
Israel	Hebrew	Students	Subject pools	Course credit	267	22.49 (2.44)	51	4.63 (.91)	4.37 (1.01)	609.52
Italy	Italian	General population	Social media	Volunteer	135	35.31 (15.50)	61	4.83 (1.05)	4.99 (1.02)	235.94
Japan	Japanese	Students	Subject pools; classrooms	Course credit or volunteer	231	22.36 (4.36)	46	4.10 (.92)	4.81 (.98)	19.40
Kenya	English	Students; general population	Classrooms; snowball recruitment	Course credit or volunteer	133	23.60 (4.91)	50	5.04 (.96)	5.22 (1.12)	8.60
South Korea	Korean	Students	Subject pools; classrooms	Course credit or volunteer	167	23.25 (3.92)	63	4.47 (.73)	4.86 (.87)	11.05
Lithuania	Lithuanian	Students; general population	Social media; classrooms	Volunteer	211	28.03 (10.33)	80	3.81 (1.08)	4.05 (.92)	213.78
Mexico	Spanish	Students; general population	Social media; classrooms	Volunteer	153	28.75 (10.97)	65	4.44 (1.13)	5.51 (1.00)	29.02
Netherlands	Dutch	General population	Online workers (Prolific Academic)	€ 1.10	300	29.58 (10.22)	41	4.56 (.92)	4.63 (.92)	340.18
Philippines	English	Students; general population	Social media	Volunteer	229	21.17 (3.64)	75	5.44 (1.05)	5.76 (.92)	67.20
Poland	Polish	Students; general population	Social media; classrooms	Volunteer	1,665	22.98 (7.54)	74	4.08 (1.17)	4.35 (1.15)	240.09
Portugal	Portuguese	General population	Subject pools	Raffle (5 prizes worth € 10.00)	264	27.58 (8.82)	76	4.03 (1.08)	5.18 (.85)	53.41

Qatar	Arabic	Students; general population	Social media; classrooms	Volunteer	146	24.23 (6.84)	82	4.44 (.81)	5.08 (1.08)	279.66
Singapore	English	Students	Subject pools	Course credit	155	21.58 (2.03)	78	4.46 (.88)	4.31 (.87)	2.77
Slovakia	Slovak	Students	classrooms	Volunteer	222	21.90 (3.89)	77	4.56 (.92)	4.63 (.96)	389.92
Spain	Spanish	General population	Social media	Volunteer	365	40.15 (13.74)	79	4.56 (1.24)	4.94 (1.32)	562.56
Turkey	Turkish	Students; general population	Social media; classrooms	Volunteer	352	31.71 (16.28)	77	4.15 (1.28)	5.72 (.84)	287.61
U.K.	English	General population	Online workers (Prolific Academic)	£0.82	316	36.81 (13.87)	70	4.16 (1.21)	5.15 (.99)	340.47
U.S.	English	General population	Social media	Volunteer	241	33.08 (18.91)	83	3.74 (1.06)	4.98 (.98)	305.59
Pooled Sample	-	-	-	-	7,844	28.91 (12.95)	70	4.44 (1.16)	4.90 (1.14)	186.64

Table A2.03. Summary statistics and other information by study site

8. COVID-19 health precautions scale development

In the main text, we report a 12-item composite scale used to measure COVID-19 health precautions, as well as two-subscales—external-facing health precautions, and internal-facing health precautions. Here, we provide details on the scale development procedures and factor analyses used to produce these composites.

Based on a measure of COVID-19 precautions that we used in previous research[31], participants were asked 15 questions concerning precautionary behaviors in response to COVID-19. Most items inquired about health behaviors, including the frequency of mask wearing, hand washing, social distancing, and disinfecting, and the importance to the participant of stocking up on supplies such as hand sanitizer and household disinfectants. Participants were also asked the extent to which they were following local lockdown restrictions, and whether they had been careful to physically distance from people outside their household. In addition to health behaviors, participants were also asked about religious precautions undertaken to prevent COVID-19 infection. Items were rated on 7-point scales, either from "never" to "as often as possible", or from "not important at all", to "extremely important". See pages S1-S2 for full measures.

We ran an exploratory factor analysis on the pooled sample across all study sites to determine the structure of COVID-19 precautions. First, we used the Kaieser-Meyer-Olkin (KMO) and Bartlett's test to determine whether these items were suitable for structure detection. The KMO test suggested that the strength of the relationships among the variables was high (KMO = .89), and Bartlett's test was significant ($\chi 2$ (105) = 48,012.74, p < .001), suggesting that the use of factor analysis was appropriate.

The R package *parameters*[22] was then used to determine how many factors to extract. There was the most agreement between methods for a three-factor solution (see Figure A2.9).
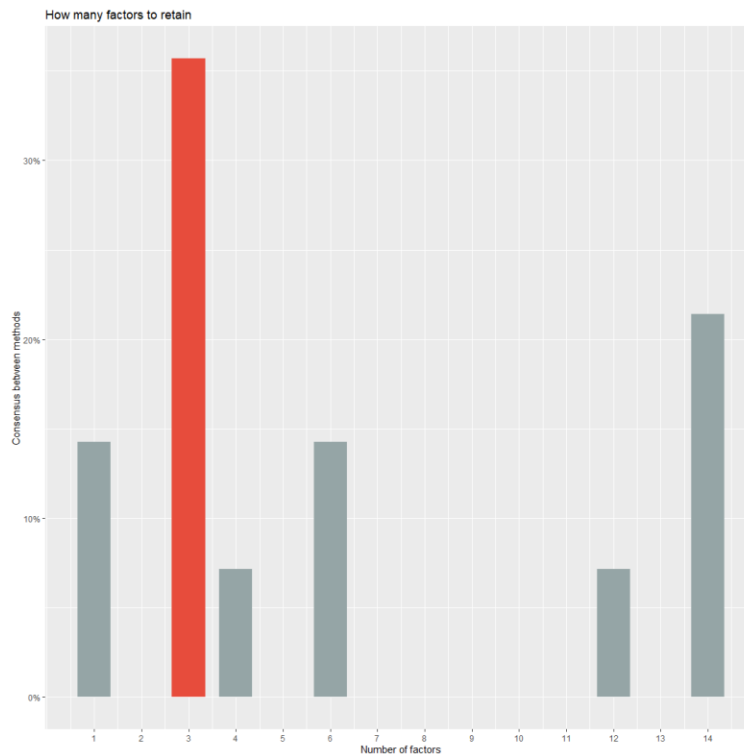
Figure A2.09. Graphical representation showing agreement between different methods for determining the number of factors to retain.

A factor analysis was then conducted with minimum residual extraction, promax rotation, and a Pearson's correlation matrix. Three factors were extracted. The three factor values had sums of squared loadings of 3.94, 2.86, and 1.76, and explained 26%, 19%, and 12% of the variance, respectively. When extracted, these three factors were conceptually coherent (see Table A2.4). For each factor, items with factor loadings greater than .40 were averaged together, producing the composite measures used in analyses. We labeled these factor composites as follows: *internal-facing or non-interpersonal health precautions* (e.g., washing hands), *external-facing or interpersonal health precautions* (e.g., observing mask wearing and social distancing), and *religious precautions* (e.g., engaging in prayer). The internal-facing and external-facing composites were largely reliable across study sites, although there was cross-society variation with low alphas in some countries; see Table A2.5 for study site-specific reliability tests for each composite. Note that we reserve the analyses of the religious precautions composite for a separate project, hence they are not included here.

Factor Analysis

	Factor 1	Factor 2	Factor 3
Importance of cleaning hands	0.61	0.14	-0.06
Importance of disinfecting home surfaces	0.73	0.02	0.12
Importance of consuming things to boost immune system	0.40	0.01	0.25
Importance of acquiring household disinfectants	0.87	-0.05	0.03
Importance of soap or hand sanitizer	0.84	0.00	-0.07
Importance of acquiring personal protective equipment	0.65	0.04	-0.11
General importance of taking COVID-19 precautions	0.16	0.69	-0.00
Frequency of mask wearing	-0.01	0.57	-0.07
Frequency of glove wearing	0.17	0.21	0.26
Frequency of physical distancing	-0.10	0.74	-0.02
Frequency of surface disinfection	0.42	0.25	0.19
Pursuit of social distancing	-0.04	0.73	0.03
Practicing individual religious behaviors in response to COVID	0.02	0.05	0.77
Practicing collective religious behaviors in response to covid	-0.04	-0.07	0.71
Change in precautionary behaviors since start of COVID pandemic	0.15	0.55	0.06

Table A2.04. Factor loadings from an exploratory factor analysis on COVID-19 precautions items.

Country	Combined COVID-19 Health Precautions Composite	Internal-Facing COVID-19 Health Precautions Composite	External-Facing COVID-19 Health Precautions Composite
Austria	0.86	0.81	0.82
Canada	0.86	0.80	0.86
Chile	0.80	0.80	0.56
China	0.86	0.84	0.66
Denmark	0.86	0.83	0.81
France	0.84	0.79	0.81
Guatemala	0.88	0.83	0.84
India	0.89	0.85	0.78
Indonesia	0.83	0.86	0.66
Israel	0.82	0.80	0.80
Italy	0.85	0.85	0.76
Japan	0.86	0.84	0.68
Kenya	0.87	0.85	0.74
South Korea	0.85	0.84	0.61
Lithuania	0.79	0.76	0.80
Mexico	0.87	0.84	0.79
Netherlands	0.86	0.84	0.79
Philippines	0.86	0.87	0.73
Poland	0.89	0.84	0.83
Portugal	0.81	0.81	0.68
Qatar	0.85	0.81	0.76
Singapore	0.80	0.82	0.61
Slovakia	0.82	0.79	0.80
Spain	0.90	0.87	0.87
Turkey	0.85	0.85	0.71
UK	0.88	0.84	0.80
US	0.86	0.81	0.86

Table A2.05. Cronbach's alphas for the combined health precautions composite, and the two internal-facing and external-facing subscale composites by study site.

We then fit a random-intercepts linear mixed model (estimated using REML) to examine the relationship between the internal-facing and external-facing precaution composites. The model included country as random effect. The two composites were highly correlated ($\beta = .50$, 95% CI [.48, .52], $t(7,837) = 56.95$, $p < .001$). Given this strong correlation, and for ease of interpretability in the analyses presented in the main text, we created an overall COVID-19 health precautions composite comprised of the raw average of all the items in both the internal-facing and external-facing composites. This combined composite was reliable across study sites (see Table A2.5), suggesting that these items cohere together. Where main text analyses were presented with the single composite factor (see Figures 1, 2, and 3), results did not conceptually change when using either of the two precautions subscales instead (see Figure A2.10-S13), although effect sizes were lower for the external-facing subscale, consistent with the interaction reported in Figure 4 in the main text.

Study Site		Correlation [95% CI]
United States		3.67% -0.01 [-0.14, 0.11]
Indonesia		3.74% 0.04 [-0.08, 0.16]
Austria		3.69% 0.04 [-0.08, 0.17]
Israel		3.79% 0.06 [-0.06, 0.18]
Canada		3.58% 0.07 [-0.06, 0.20]
Poland		4.93% 0.08 [0.03, 0.13]
South Korea		2.87% 0.10 [-0.07, 0.28]
Kenya		2.96% 0.10 [-0.06, 0.27]
Slovakia		3.61% 0.13 [-0.00, 0.26]
Singapore		3.19% 0.14 [-0.01, 0.30]
Mexico		3.16% 0.15 [-0.01, 0.30]
Qatar		3.11% 0.16 [0.00, 0.32]
France		3.37% 0.18 [0.03, 0.32]
Netherlands		3.98% 0.19 [0.08, 0.30]
Turkey		4.14% 0.20 [0.10, 0.30]
Guatemala		4.36% 0.20 [0.11, 0.29]
Japan		3.63% 0.21 [0.08, 0.34]
Lithuania		3.62% 0.22 [0.09, 0.34]
U.K.		4.05% 0.23 [0.12, 0.33]
Portugal		3.91% 0.26 [0.14, 0.37]
Denmark		4.07% 0.26 [0.16, 0.37]
Italy		3.21% 0.31 [0.16, 0.46]
Spain		4.27% 0.31 [0.22, 0.41]
Philippines		3.85% 0.32 [0.21, 0.44]
Chile		3.77% 0.38 [0.25, 0.50]
India		3.17% 0.38 [0.22, 0.53]
China		4.31% 0.42 [0.33, 0.51]
RE Model		100.00% 0.19 [0.15, 0.24]

Figure A2.10. Results of random-effects meta-analysis examining the *zero-order correlation* between traditionalism and the *internal-facing precautions composite*. Compare to Figure 1 in the main text.

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Study Site		Correlation [95% CI]

United States	3.76%	-0.14 [-0.26, -0.01]
Canada	3.66%	-0.09 [-0.22, 0.04]
Poland	4.67%	-0.03 [-0.08, 0.02]
Slovakia	3.65%	-0.03 [-0.16, 0.11]
Turkey	4.03%	-0.00 [-0.11, 0.10]
Austria	3.73%	0.02 [-0.10, 0.15]
Qatar	3.20%	0.04 [-0.12, 0.20]
Chile	3.53%	0.06 [-0.08, 0.20]
Lithuania	3.60%	0.07 [-0.07, 0.20]
France	3.42%	0.07 [-0.08, 0.22]
U.K.	3.96%	0.08 [-0.03, 0.19]
Singapore	3.29%	0.08 [-0.07, 0.24]
Indonesia	3.80%	0.11 [-0.01, 0.23]
Kenya	3.13%	0.12 [-0.05, 0.28]
South Korea	3.05%	0.12 [-0.06, 0.29]
Israel	3.84%	0.13 [0.01, 0.25]
Netherlands	3.94%	0.13 [0.02, 0.24]
Mexico	3.31%	0.16 [0.00, 0.31]
Italy	3.18%	0.16 [-0.00, 0.33]
Guatemala	4.24%	0.17 [0.08, 0.25]
Portugal	3.86%	0.18 [0.07, 0.30]
Spain	4.14%	0.24 [0.14, 0.34]
Japan	3.72%	0.25 [0.12, 0.37]
Denmark	4.03%	0.25 [0.14, 0.35]
Philippines	3.82%	0.28 [0.16, 0.40]
India	3.26%	0.35 [0.19, 0.51]
China	4.20%	0.40 [0.31, 0.50]
RE Model	100.00%	0.12 [0.07, 0.17]

Correlation Coefficient

Figure A2.11. Results of random-effects meta-analysis examining the *zero-order correlation* between traditionalism and the *external-facing precautions composite*. Compare to Figure 1 in the main text.

Study Site		Correlation [95% CI]
Kenya		2.67% -0.03 [-0.19, 0.13]
Israel		3.80% 0.02 [-0.10, 0.13]
Indonesia		3.60% 0.07 [-0.06, 0.19]
Canada		3.48% 0.09 [-0.03, 0.22]
Austria		3.94% 0.10 [-0.01, 0.21]
Singapore		3.00% 0.10 [-0.04, 0.25]
United States		3.85% 0.10 [-0.01, 0.22]
Qatar		2.78% 0.13 [-0.02, 0.29]
Slovakia		3.46% 0.13 [0.01, 0.26]
Japan		3.55% 0.16 [0.03, 0.28]
Poland		5.93% 0.19 [0.14, 0.24]
Denmark		4.28% 0.19 [0.09, 0.29]
Mexico		2.93% 0.19 [0.04, 0.34]
South Korea		1.97% 0.19 [-0.01, 0.40]
Turkey		4.42% 0.20 [0.11, 0.30]
France		3.14% 0.21 [0.07, 0.35]
Lithuania		3.41% 0.22 [0.09, 0.35]
Guatemala		4.81% 0.22 [0.14, 0.30]
India		2.85% 0.22 [0.07, 0.37]
Netherlands		4.20% 0.23 [0.12, 0.33]
Portugal		3.97% 0.25 [0.14, 0.36]
China		4.52% 0.25 [0.16, 0.35]
U.K.		4.29% 0.27 [0.17, 0.37]
Italy		2.99% 0.28 [0.14, 0.43]
Philippines		3.74% 0.30 [0.18, 0.41]
Spain		4.68% 0.31 [0.22, 0.40]
Chile		3.75% 0.38 [0.26, 0.49]
RE Model		100.00% 0.19 [0.16, 0.22]

Figure A2.12. Results of random-effects meta-analysis examining the *semi-partial correlation* between traditionalism and the *internal-facing precautions composite* after *adjusting for the effects of the five suppressor variables*. Compare to Figure 3 in the main text.
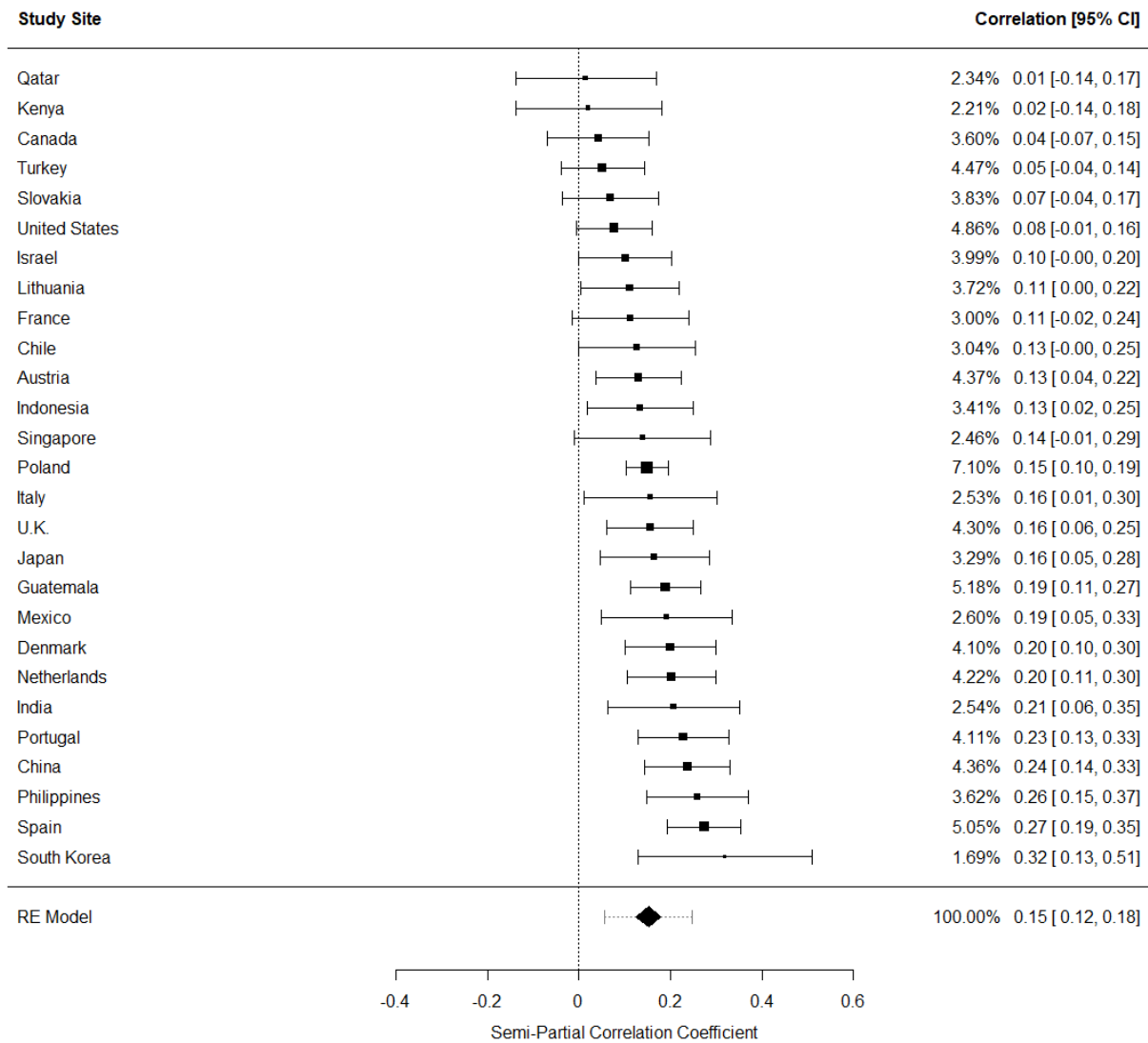
Figure A2.13. Results of random-effects meta-analysis examining the *semi-partial correlation* between traditionalism and the *external-facing precautions composite* after *adjusting for the effects of the five suppressor variables*. Compare to Figure 3 in the main text.

9. Traditionalism scale development

We included two pre-validated scales in order to measure traditionalism. First, we included the 6-item conventionalism subscale of the Aggression-Submission-Conventionalism scale[1], which measures the general tendency to endorse one's society's traditional social norms, setting aside the actual content of those traditions (e.g., "Traditions are the foundation of a

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healthy society and should be respected"). Items were rated on 7-point scales, from "strongly disagree" to "strongly agree", and half of the items were reverse coded (e.g., "People emphasize tradition too much."). Second, we used the 4-item authority subscale from the Moral Foundations Questionnaire Short Version[2,32], which similarly assesses whether individuals respect traditions and authorities, both generally (e.g., "To what extent are the following considerations relevant to your thinking… Whether or not someone conformed to the traditions of society."), and in relation to specific values regarding gender and age roles (e.g., "Respect for authority is something all children need to learn."). Items were rated on 7-point scales, either from "Not at all relevant", to "Extremely relevant", or from "Strongly Disagree" to "Strongly Agree". In particular, we chose to include the Moral Foundations and Conventionalism items because they have been widely tested in many languages in cross-cultural psychology research[33–35].

Because we wanted to measure the tendency to endorse traditional social norms as a general dimension of individual difference as broadly as possible, we were interested in whether all ten traditionalism items together (six from the Conventionalism scale, and four from the Moral Foundations authority scale) would reliably load onto a single traditionalism factor. First, we examined the correlation structure between the ten items by study site. We observed that, at some study sites, the three reverse-coded items from the conventionalism scale did not strongly and reliably negatively correlate with the positively coded items as would be expected (see Table A2.6 for the correlation between negatively-coded and positively-coded Conventionalism items by study site). Following a literature review, we found that reverse-coded items may frequently be problematic in cross-cultural psychological research[36–38]. We therefore dropped the three reverse-coded conventionalism items before conducting the factor analysis.

country	r	p-value
china	-0.13	0.018
japan	-0.14	0.039
philippines	0.12	0.065
italy	-0.49	0.000
chile	-0.34	0.000
mexico	-0.06	0.443
portugal	-0.45	0.000
qatar	-0.26	0.001
spain	-0.28	0.000
france	-0.40	0.000
uk	-0.56	0.000
israel	-0.24	0.000
lithuania	-0.39	0.000
guatemala	-0.32	0.000
singapore	-0.25	0.002
turkey	-0.43	0.000
netherlands	-0.48	0.000
korea	-0.24	0.007
indonesia	-0.16	0.009
slovakia	-0.43	0.000
poland	-0.50	0.000
austria	-0.32	0.000
canada	-0.30	0.000
us	-0.29	0.000
kenya	-0.22	0.012
denmark	-0.14	0.012
india	0.27	0.003

Table A2.06. Product-moment correlations between reverse and non-reverse coded conventionalism items by study site.

We then ran an exploratory factor analysis on the pooled sample across all study sites to determine whether it was appropriate to group the conventionalism and moral foundations authority items (minus the reverse-coded items, see above) into a single factor. First, we used the Kaieser-Meyer-Olkin (KMO) and Bartlett's test to determine whether these items were suitable for structure detection. The KMO test suggested that the strength of the relationships among the variables was moderately high (KMO = .75), and Bartlett's test was significant ($\chi 2\ (21) = 15{,}315.74$, $p < .001$), suggesting that the use of factor analysis was appropriate.

The R package *parameters* [22] was then used to determine how many factors to extract. There was the most agreement between methods for a one-factor solution (see Figure A2.14).

How many factors to retain

Consensus between methods
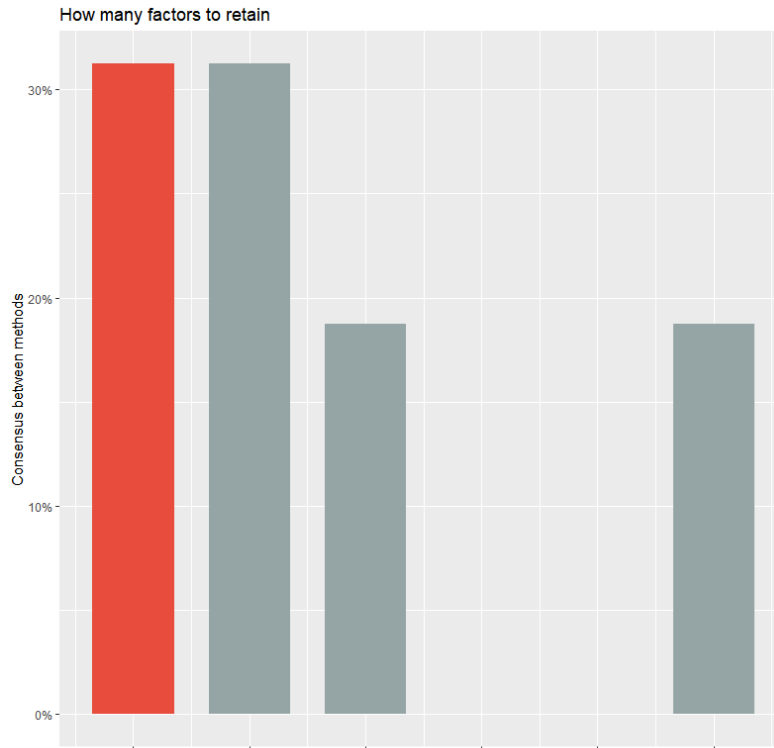
Figure A2.14. Graphical representation showing agreement between different methods for determining the number of factors to retain.

A factor analysis was then conducted with minimum residual extraction, and a Pearson's correlation matrix. A single factor was extracted. The single factor had a sum of squared loadings of 2.43, and explained 35% of the variance. To create a composite traditionalism factor, we then averaged together those items with factor loadings greater than .5, comprising six out of the seven items (see Table A2.7). Scale reliability for this composite varied quite widely across study sites (see Table A2.8).

Factor Analysis

	Factor 1
Traditions should be respected – conventionalism scale	.67
People should follow social norms – conventionalism scale	.63
People should respect social norms – conventionalism scale	.69
Importance of whether people show a lack of respect for authority – moral foundations authority scale	.51
Importance of whether people conform to traditions – moral foundations authority scale	.54
Men and women should have different roles in society – moral foundations authority scale	.44
Children should learn respect for authority – moral foundations authority scale	.60

Table A2.07. Factor loadings from an exploratory factor analysis on traditionalism items.

Country	Conventionalism scale	Moral Foundations Authority scale	Traditionalism Factor Composite
Austria	0.7105586	0.5655188	0.7309919
Canada	0.7516936	0.6350294	0.7951703
Chile	0.7061326	0.7561902	0.8470702
China	0.5875297	0.6148619	0.7127438
Denmark	0.6435492	0.5634853	0.7534785
France	0.7853885	0.6128833	0.8051261
Guatemala	0.7242010	0.6470017	0.8159033
India	0.2059427	0.6094132	0.6983367
Indonesia	0.5736353	0.2327229	0.6521108
Israel	0.6589104	0.5099610	0.6908832
Italy	0.8017381	0.5443016	0.7965177
Japan	0.6315254	0.5900602	0.7394633
Kenya	0.6007971	0.4363724	0.5270011
South Korea	0.6057268	0.5602076	0.7005701
Lithuania	0.7723525	0.6328137	0.7896508
Mexico	0.5945571	0.5231161	0.7019779
Netherlands	0.7891934	0.6213683	0.7667636
Philippines	0.5385436	0.5892432	0.8055702
Poland	0.8142883	0.6945428	0.8157230
Portugal	0.7958263	0.6911884	0.8254066
Qatar	0.6789908	0.2812414	0.3878252
Singapore	0.6793446	0.6854164	0.7707547
Slovakia	0.7626441	0.4884737	0.6777858
Spain	0.7102364	0.6048047	0.7868105
Turkey	0.7759173	0.7738583	0.8112405
UK	0.8488891	0.7563903	0.8755346
US	0.6949864	0.7360622	0.7846093

Table A2.08. Cronbach's alphas by study site for the Traditionalism composite used to measure traditionalism in the main text analyses, as well as for the Moral Foundations Authority and Conventionalism subscales included in the survey.

In order to determine whether the lack of scale reliability at some of the study sites was affecting results, we first conducted meta-analyses that replicated the main text analyses (see Figures 1 and 3), disattenuating for unreliability; this did not conceptually change the results (see Figures S7 and S8). Next, we re-ran the main text meta-analyses using each of the six items individually from our traditionalism factor, in place of the composite traditionalism score (see Figures S15-S26). Although effect sizes varied some, results did not conceptually differ across items, suggesting that the pattern of association between traditionalism-related items and precautions is consistent, and low scale reliability at some study sites did not conceptually impact the results.

Study Site		Correlation [95% CI]
United States		3.75% -0.13 [-0.26, -0.01]
Austria		3.75% -0.09 [-0.21, 0.04]
Canada		3.65% -0.06 [-0.19, 0.07]
Poland		4.63% -0.04 [-0.09, 0.02]
Kenya		3.11% -0.03 [-0.20, 0.14]
Slovakia		3.65% -0.02 [-0.15, 0.11]
Mexico		3.25% 0.01 [-0.15, 0.17]
Indonesia		3.77% 0.02 [-0.10, 0.14]
Netherlands		3.90% 0.02 [-0.09, 0.14]
Spain		4.04% 0.04 [-0.06, 0.14]
South Korea		3.05% 0.07 [-0.10, 0.25]
Singapore		3.31% 0.10 [-0.06, 0.25]
Lithuania		3.62% 0.10 [-0.03, 0.24]
Israel		3.83% 0.13 [0.01, 0.24]
Denmark		3.95% 0.13 [0.02, 0.24]
Guatemala		4.20% 0.14 [0.05, 0.23]
Turkey		4.05% 0.15 [0.05, 0.26]
France		3.47% 0.16 [0.01, 0.30]
U.K.		3.98% 0.16 [0.06, 0.27]
Portugal		3.85% 0.18 [0.06, 0.29]
Qatar		3.31% 0.20 [0.05, 0.36]
Chile		3.64% 0.25 [0.11, 0.38]
Japan		3.72% 0.25 [0.12, 0.37]
Italy		3.32% 0.29 [0.14, 0.45]
India		3.19% 0.32 [0.15, 0.48]
China		4.11% 0.33 [0.24, 0.43]
Philippines		3.88% 0.34 [0.23, 0.46]
RE Model		100.00% 0.11 [0.06, 0.16]

Figure A2.15. Results of random-effects meta-analysis examining the *zero-order correlation* between the traditionalism item *traditions should be respected* and the COVID-19 health precautions composite. Compare to Figure 1 in the main text.

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Study Site   **Correlation [95% CI]**

Study Site	Weight	Correlation [95% CI]
Canada	3.58%	-0.05 [-0.18, 0.08]
Israel	3.83%	0.01 [-0.11, 0.13]
United States	3.69%	0.01 [-0.12, 0.13]
Poland	5.38%	0.03 [-0.02, 0.08]
Qatar	2.97%	0.07 [-0.09, 0.23]
Kenya	2.80%	0.08 [-0.10, 0.25]
Austria	3.72%	0.08 [-0.04, 0.21]
Indonesia	3.80%	0.11 [-0.01, 0.23]
U.K.	4.08%	0.11 [0.00, 0.22]
Slovakia	3.60%	0.11 [-0.02, 0.25]
Turkey	4.23%	0.12 [0.02, 0.22]
South Korea	2.76%	0.12 [-0.05, 0.29]
Guatemala	4.52%	0.12 [0.03, 0.22]
Netherlands	4.04%	0.14 [0.03, 0.25]
Mexico	3.07%	0.15 [-0.01, 0.31]
Lithuania	3.58%	0.16 [0.03, 0.29]
Japan	3.59%	0.16 [0.03, 0.29]
Portugal	3.91%	0.18 [0.06, 0.30]
Denmark	4.11%	0.19 [0.08, 0.30]
Singapore	3.16%	0.19 [0.04, 0.34]
Italy	2.94%	0.20 [0.03, 0.36]
France	3.36%	0.21 [0.07, 0.35]
Spain	4.40%	0.27 [0.17, 0.36]
Chile	3.65%	0.30 [0.17, 0.43]
China	4.34%	0.33 [0.23, 0.43]
India	2.95%	0.34 [0.17, 0.50]
Philippines	3.95%	0.34 [0.23, 0.46]
RE Model	100.00%	0.15 [0.11, 0.19]

Correlation Coefficient
-0.4 -0.2 0 0.2 0.4 0.6

Figure A2.16. Results of random-effects meta-analysis examining the *zero-order correlation* between the traditionalism item *people should follow social norms* and the COVID-19 health precautions composite. Compare to Figure 1 in the main text.

Figure A2.17. Results of random-effects meta-analysis examining the *zero-order correlation* between the traditionalism item *people should respect social norms* and the COVID-19 health precautions composite. Compare to Figure 1 in the main text.

Study Site		Correlation [95% CI]
Qatar		2.98% -0.12 [-0.28, 0.04]
Indonesia		3.83% -0.03 [-0.16, 0.09]
United States		3.74% 0.00 [-0.12, 0.13]
Turkey		4.27% 0.02 [-0.09, 0.12]
Canada		3.62% 0.03 [-0.10, 0.16]
India		2.63% 0.04 [-0.14, 0.23]
Singapore		3.09% 0.06 [-0.10, 0.22]
Israel		3.90% 0.07 [-0.05, 0.19]
Slovakia		3.64% 0.07 [-0.06, 0.20]
Poland		5.54% 0.07 [0.02, 0.12]
Kenya		2.23% 0.08 [-0.13, 0.29]
France		3.29% 0.09 [-0.06, 0.23]
South Korea		2.77% 0.10 [-0.07, 0.28]
Austria		3.79% 0.10 [-0.02, 0.23]
Mexico		3.08% 0.13 [-0.03, 0.29]
Philippines		3.70% 0.14 [0.01, 0.26]
Lithuania		3.60% 0.14 [0.01, 0.27]
Portugal		3.95% 0.16 [0.04, 0.28]
China		4.21% 0.17 [0.06, 0.28]
Japan		3.65% 0.17 [0.04, 0.30]
Guatemala		4.65% 0.17 [0.08, 0.26]
Italy		2.97% 0.18 [0.02, 0.35]
U.K.		4.21% 0.19 [0.08, 0.30]
Netherlands		4.17% 0.21 [0.10, 0.32]
Chile		3.57% 0.21 [0.08, 0.35]
Denmark		4.27% 0.26 [0.15, 0.36]
Spain		4.66% 0.37 [0.28, 0.46]
RE Model		100.00% 0.12 [0.08, 0.16]

Figure A2.18. Results of random-effects meta-analysis examining the *zero-order correlation* between the traditionalism item *importance of whether people show a lack of respect for authority* and the COVID-19 health precautions composite. Compare to Figure 1 in the main text.

Study Site		Correlation [95% CI]
France		3.29% -0.06 [-0.21, 0.09]
Austria		3.76% -0.06 [-0.18, 0.07]
United States		3.74% -0.02 [-0.14, 0.11]
Indonesia		3.82% -0.01 [-0.13, 0.11]
Poland		5.33% 0.01 [-0.04, 0.07]
Slovakia		3.63% 0.02 [-0.12, 0.15]
Kenya		2.72% 0.02 [-0.16, 0.20]
Qatar		3.01% 0.03 [-0.13, 0.19]
Netherlands		4.03% 0.03 [-0.08, 0.14]
Israel		3.87% 0.04 [-0.09, 0.16]
Mexico		3.09% 0.04 [-0.12, 0.20]
Singapore		3.12% 0.05 [-0.11, 0.20]
India		2.72% 0.07 [-0.11, 0.25]
Turkey		4.23% 0.08 [-0.03, 0.18]
Lithuania		3.58% 0.09 [-0.05, 0.22]
South Korea		2.81% 0.09 [-0.09, 0.26]
Philippines		3.69% 0.12 [-0.01, 0.24]
Canada		3.66% 0.12 [-0.01, 0.25]
U.K.		4.12% 0.12 [0.01, 0.23]
Guatemala		4.51% 0.14 [0.05, 0.23]
Spain		4.30% 0.15 [0.05, 0.25]
Japan		3.67% 0.19 [0.06, 0.32]
Denmark		4.14% 0.21 [0.10, 0.32]
Italy		3.06% 0.23 [0.07, 0.39]
Chile		3.68% 0.28 [0.15, 0.41]
Portugal		4.11% 0.31 [0.20, 0.42]
China		4.33% 0.31 [0.21, 0.41]
RE Model		100.00% 0.10 [0.06, 0.14]

Figure A2.19. Results of random-effects meta-analysis examining the *zero-order correlation* between the traditionalism item *importance of whether people conform to traditions* and the COVID-19 health precautions composite. Compare to Figure 1 in the main text.

Study Site   **Correlation [95% CI]**

Study Site		
Qatar	2.98%	-0.12 [-0.28, 0.04]
Indonesia	3.83%	-0.03 [-0.16, 0.09]
United States	3.74%	0.00 [-0.12, 0.13]
Turkey	4.27%	0.02 [-0.09, 0.12]
Canada	3.62%	0.03 [-0.10, 0.16]
India	2.63%	0.04 [-0.14, 0.23]
Singapore	3.09%	0.06 [-0.10, 0.22]
Israel	3.90%	0.07 [-0.05, 0.19]
Slovakia	3.64%	0.07 [-0.06, 0.20]
Poland	5.54%	0.07 [0.02, 0.12]
Kenya	2.23%	0.08 [-0.13, 0.29]
France	3.29%	0.09 [-0.06, 0.23]
South Korea	2.77%	0.10 [-0.07, 0.28]
Austria	3.79%	0.10 [-0.02, 0.23]
Mexico	3.08%	0.13 [-0.03, 0.29]
Philippines	3.70%	0.14 [0.01, 0.26]
Lithuania	3.60%	0.14 [0.01, 0.27]
Portugal	3.95%	0.16 [0.04, 0.28]
China	4.21%	0.17 [0.06, 0.28]
Japan	3.65%	0.17 [0.04, 0.30]
Guatemala	4.65%	0.17 [0.08, 0.26]
Italy	2.97%	0.18 [0.02, 0.35]
U.K.	4.21%	0.19 [0.08, 0.30]
Netherlands	4.17%	0.21 [0.10, 0.32]
Chile	3.57%	0.21 [0.08, 0.35]
Denmark	4.27%	0.26 [0.15, 0.36]
Spain	4.66%	0.37 [0.28, 0.46]
RE Model	100.00%	0.12 [0.08, 0.16]

Correlation Coefficient

Figure A2.20. Results of random-effects meta-analysis examining the *zero-order correlation* between the traditionalism item *children should learn respect for authority* and the COVID-19 health precautions composite. Compare to Figure 1 in the main text.
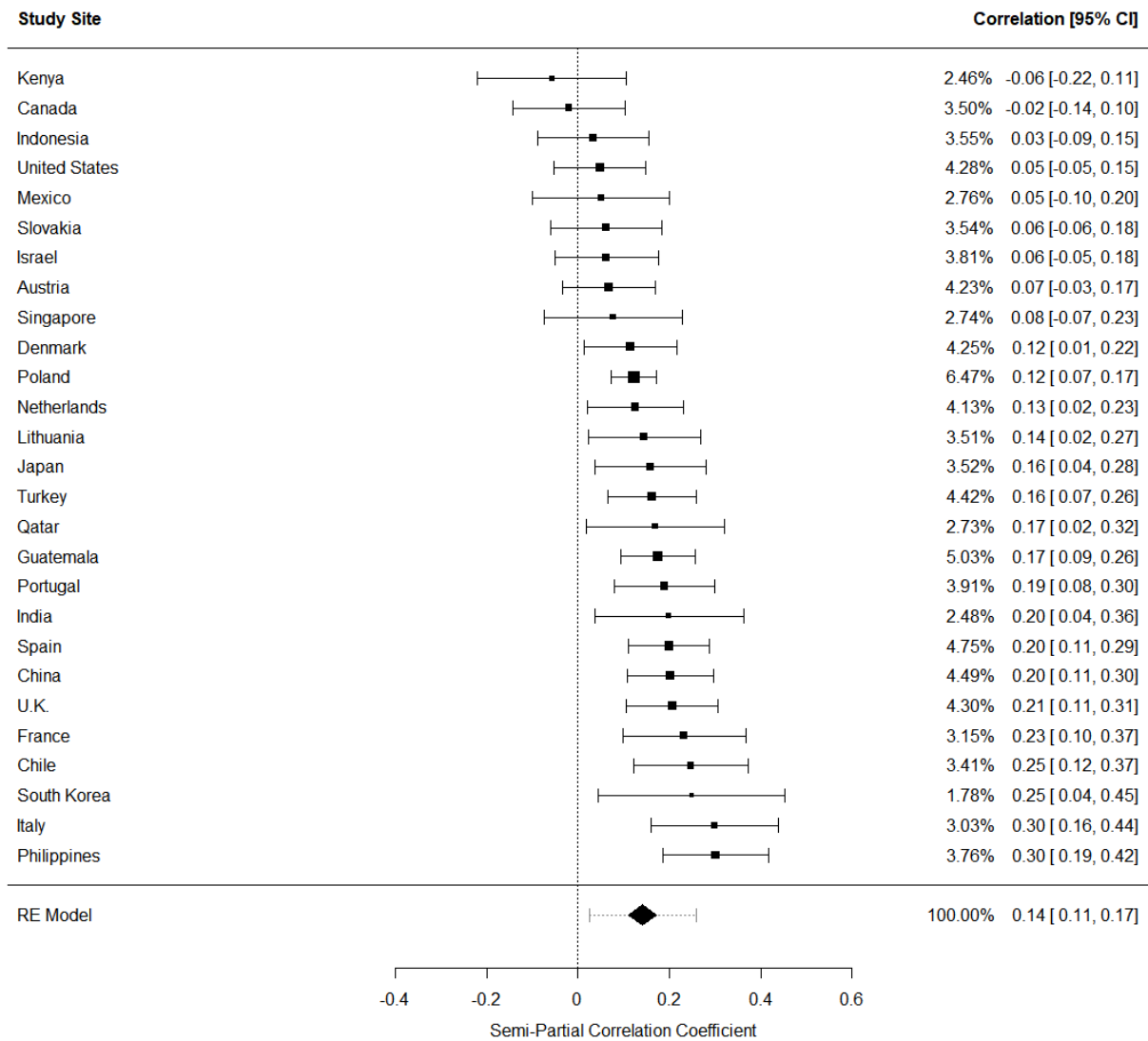
Figure A2.21. Results of random-effects meta-analysis examining the *semi-partial correlation* between the traditionalism item *traditions should be respected* and the COVID-19 health precautions composite after *adjusting for the effects of the five suppressor variables*. Compare to Figure 3 in the main text.

Study Site		Correlation [95% CI]
Canada		3.41% -0.00 [-0.13, 0.12]
Israel		3.76% 0.01 [-0.10, 0.13]
Qatar		2.47% 0.05 [-0.11, 0.20]
Kenya		2.24% 0.05 [-0.11, 0.22]
Austria		4.27% 0.07 [-0.03, 0.17]
Poland		7.39% 0.10 [0.05, 0.15]
United States		4.37% 0.10 [-0.00, 0.20]
Turkey		4.42% 0.11 [0.01, 0.21]
Indonesia		3.51% 0.12 [-0.00, 0.24]
Slovakia		3.49% 0.12 [0.00, 0.24]
Guatemala		5.27% 0.13 [0.05, 0.22]
U.K.		4.26% 0.14 [0.04, 0.24]
Netherlands		4.18% 0.15 [0.04, 0.25]
Denmark		4.35% 0.15 [0.05, 0.25]
Japan		3.44% 0.16 [0.04, 0.28]
Lithuania		3.44% 0.16 [0.04, 0.28]
South Korea		1.52% 0.19 [-0.03, 0.40]
Mexico		2.73% 0.20 [0.05, 0.34]
Spain		4.95% 0.20 [0.11, 0.29]
China		4.61% 0.20 [0.11, 0.30]
Singapore		2.73% 0.21 [0.06, 0.35]
Italy		2.69% 0.22 [0.07, 0.36]
Portugal		3.96% 0.22 [0.11, 0.33]
India		2.36% 0.23 [0.07, 0.39]
France		3.09% 0.26 [0.13, 0.40]
Chile		3.35% 0.27 [0.14, 0.39]
Philippines		3.73% 0.31 [0.20, 0.42]
RE Model		100.00% 0.15 [0.12, 0.18]

Semi-Partial Correlation Coefficient

Figure A2.22. Results of random-effects meta-analysis examining the *semi-partial correlation* between the traditionalism item *people should follow social norms* and the COVID-19 health precautions composite after *adjusting for the effects of the five suppressor variables*. Compare to Figure 3 in the main text.

Study Site		Correlation [95% CI]
Israel		3.78% 0.05 [-0.07, 0.16]
Canada		3.47% 0.06 [-0.07, 0.18]
Slovakia		3.51% 0.08 [-0.04, 0.20]
Indonesia		3.52% 0.08 [-0.04, 0.20]
Singapore		2.69% 0.09 [-0.06, 0.24]
Austria		4.24% 0.09 [-0.01, 0.19]
Qatar		2.60% 0.09 [-0.06, 0.25]
Turkey		4.35% 0.10 [0.00, 0.20]
Kenya		2.41% 0.11 [-0.06, 0.27]
Poland		6.66% 0.11 [0.06, 0.16]
United States		4.32% 0.11 [0.01, 0.21]
Netherlands		4.12% 0.13 [0.02, 0.23]
Lithuania		3.45% 0.13 [0.01, 0.26]
Denmark		4.26% 0.13 [0.03, 0.24]
China		4.43% 0.15 [0.05, 0.25]
Guatemala		5.07% 0.17 [0.08, 0.25]
Portugal		3.87% 0.17 [0.06, 0.28]
Japan		3.50% 0.17 [0.05, 0.29]
U.K.		4.27% 0.20 [0.10, 0.30]
France		3.04% 0.20 [0.07, 0.34]
Mexico		2.86% 0.20 [0.06, 0.35]
Spain		4.79% 0.21 [0.12, 0.30]
Italy		2.86% 0.25 [0.11, 0.40]
Chile		3.39% 0.27 [0.14, 0.39]
South Korea		1.76% 0.28 [0.07, 0.48]
Philippines		3.80% 0.33 [0.22, 0.44]
India		2.98% 0.42 [0.28, 0.56]
RE Model		100.00% 0.16 [0.13, 0.19]

Semi-Partial Correlation Coefficient

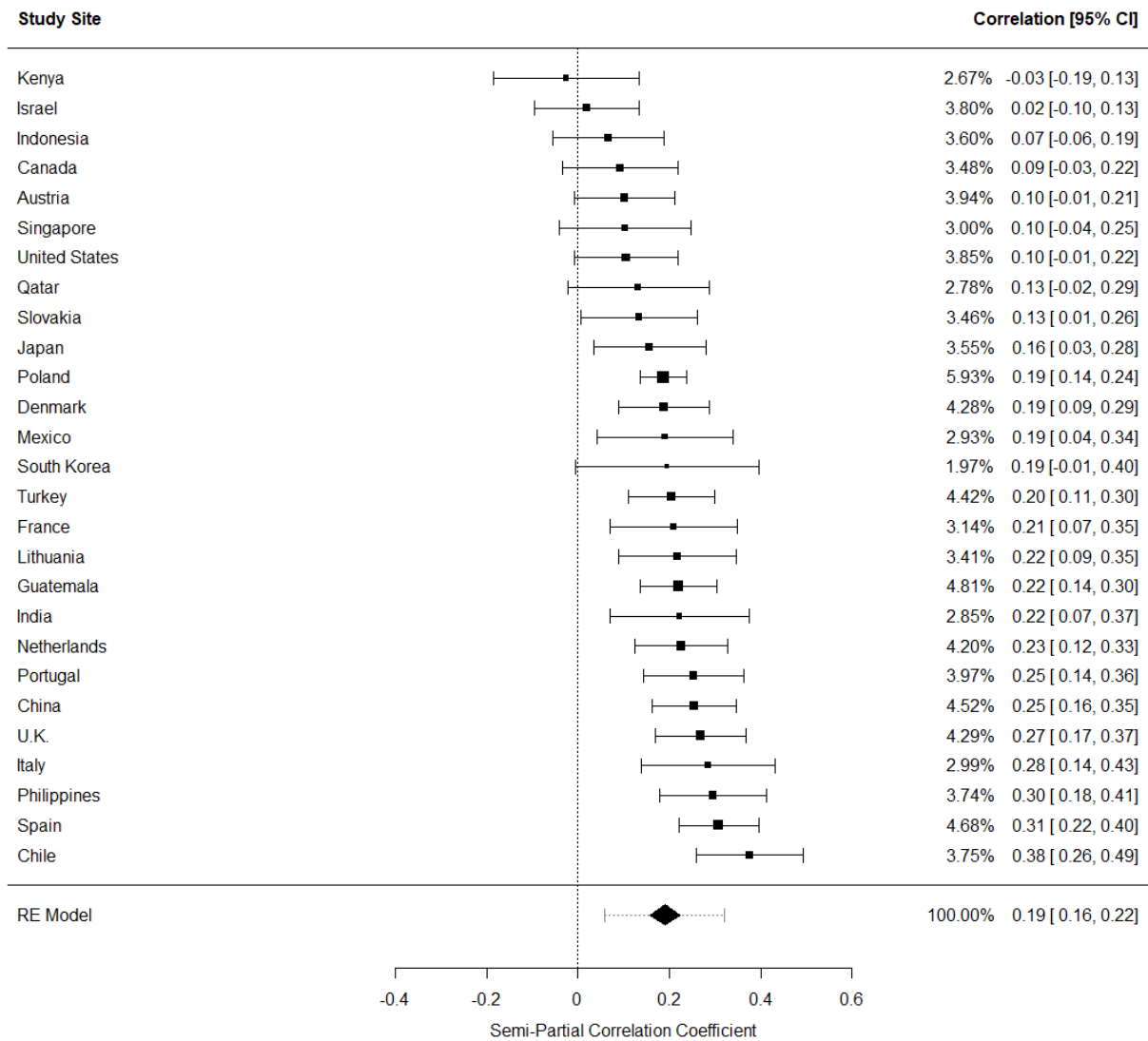**Figure A2.23.** Results of random-effects meta-analysis examining the *semi-partial correlation* between the traditionalism item *people should respect social norms* and the COVID-19 health precautions composite after *adjusting for the effects of the five suppressor variables*. Compare to Figure 3 in the main text.

| Study Site		Correlation [95% CI]
Qatar	2.83%	-0.13 [-0.29, 0.02]
Indonesia	3.63%	-0.03 [-0.15, 0.09]
India	2.51%	-0.02 [-0.19, 0.15]
Singapore	2.88%	0.02 [-0.14, 0.17]
Israel	3.86%	0.02 [-0.09, 0.14]
Turkey	4.31%	0.04 [-0.05, 0.14]
Kenya	2.14%	0.06 [-0.13, 0.25]
Slovakia	3.63%	0.07 [-0.05, 0.19]
Japan	3.55%	0.10 [-0.03, 0.22]
Canada	3.62%	0.10 [-0.02, 0.22]
Mexico	2.94%	0.11 [-0.03, 0.26]
Italy	2.98%	0.12 [-0.03, 0.26]
Poland	6.00%	0.12 [0.07, 0.17]
France	3.14%	0.13 [-0.01, 0.27]
United States	4.31%	0.13 [0.03, 0.23]
China	4.38%	0.13 [0.03, 0.23]
Philippines	3.55%	0.14 [0.01, 0.26]
Austria	4.28%	0.14 [0.04, 0.24]
Lithuania	3.61%	0.16 [0.04, 0.29]
Portugal	3.94%	0.18 [0.06, 0.29]
Guatemala	4.91%	0.18 [0.10, 0.26]
Denmark	4.30%	0.18 [0.08, 0.28]
South Korea	1.87%	0.19 [-0.02, 0.40]
U.K.	4.28%	0.20 [0.10, 0.30]
Chile	3.46%	0.22 [0.09, 0.34]
Netherlands	4.26%	0.23 [0.13, 0.33]
Spain	4.85%	0.31 [0.23, 0.40]
RE Model	100.00%	0.12 [0.09, 0.16]

Figure A2.24. Results of random-effects meta-analysis examining the *semi-partial correlation* between the traditionalism item *importance of whether people show a lack of respect for authority* and the COVID-19 health precautions composite after *adjusting for the effects of the five suppressor variables*. Compare to Figure 3 in the main text.
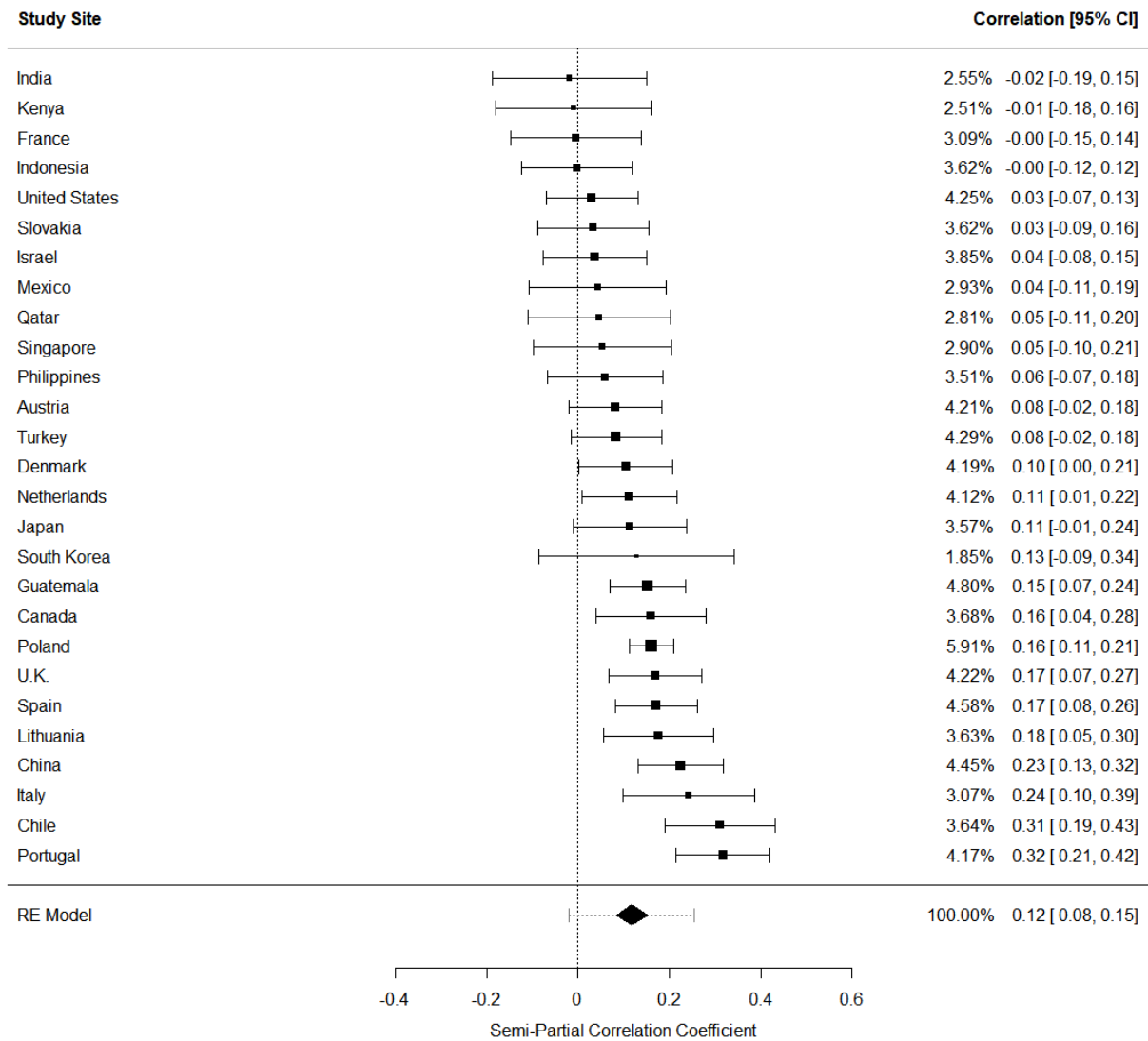
Figure A2.25. Results of random-effects meta-analysis examining the *semi-partial correlation* between the traditionalism item *importance of whether people conform to traditions* and the COVID-19 health precautions composite after *adjusting for the effects of the five suppressor variables*. Compare to Figure 3 in the main text.
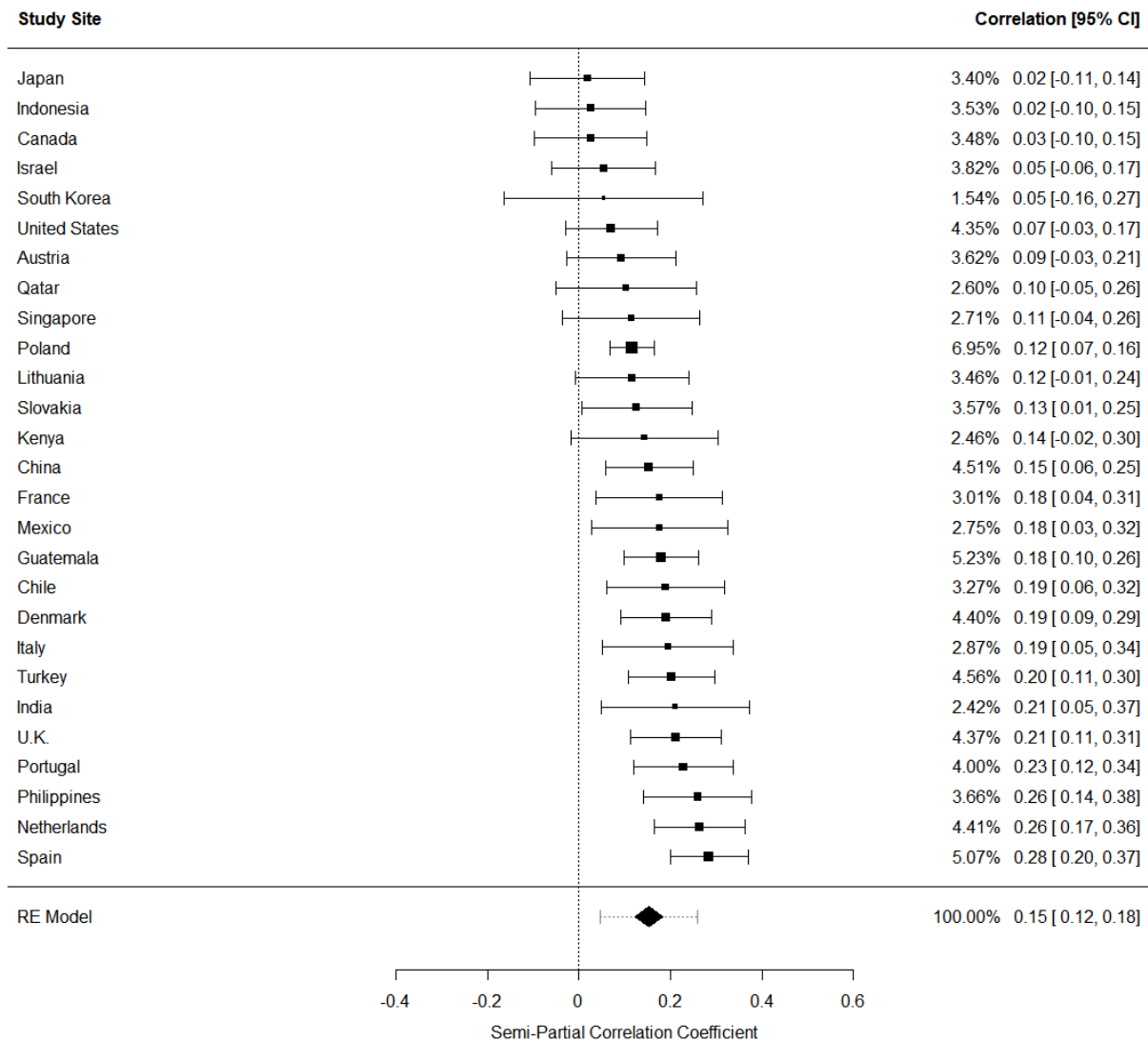
Figure A2.26. Results of random-effects meta-analysis examining the *semi-partial correlation* between the traditionalism item *children should learn respect for authority* and the COVID-19 health precautions composite after *adjusting for the effects of the five suppressor variables*. Compare to Figure 3 in the main text.

We also tested whether results reported with the traditionalism composite were sensitive to the fact that the reverse-coded conventionalism items had been removed. main text results did not substantially conceptually change when we used a more expansive traditionalism composite that included all items (including the reverse coded ones) from the conventionalism and moral foundations authority subscales (see Figures A2.27- A2.28). However, effect sizes were smaller, which we attribute to the noise introduced by the reverse-coded items. Likewise, meta-analysis results did not conceptually change when substituting composites based on either the original Conventionalism or Moral Foundations authority subscales for the main text traditionalism

composite (see Figures A2.29- A2.32), although effect sizes tended to be lower due to increased noise. See Table A2.8 for scale reliabilities for the Conventionalism and Authority composites. Taken in sum, traditionalism could be measured in several different ways based on the data that were collected. Although there were researcher degrees of freedom in making decisions about how to construct a reliable traditionalism composite, using alternative decision-points results in conceptually similar findings, suggesting that results are robust to these kinds of research decisions.

Study Site		Correlation [95% CI]
United States	3.73%	-0.10 [-0.23, 0.02]
Kenya	3.04%	-0.09 [-0.26, 0.08]
Indonesia	3.78%	-0.01 [-0.14, 0.11]
Poland	4.83%	-0.00 [-0.05, 0.05]
South Korea	2.93%	-0.00 [-0.18, 0.18]
Austria	3.72%	0.01 [-0.12, 0.13]
Canada	3.62%	0.02 [-0.12, 0.15]
Slovakia	3.63%	0.06 [-0.07, 0.19]
Netherlands	3.94%	0.10 [-0.02, 0.21]
Israel	3.84%	0.11 [-0.01, 0.23]
Singapore	3.24%	0.11 [-0.04, 0.27]
Qatar	3.16%	0.12 [-0.04, 0.28]
Guatemala	4.31%	0.14 [0.06, 0.23]
Spain	4.15%	0.16 [0.06, 0.26]
Denmark	4.00%	0.17 [0.07, 0.28]
France	3.43%	0.18 [0.03, 0.32]
Mexico	3.27%	0.18 [0.03, 0.33]
Philippines	3.73%	0.18 [0.06, 0.31]
U.K.	4.03%	0.19 [0.08, 0.30]
Japan	3.66%	0.19 [0.06, 0.32]
Turkey	4.14%	0.21 [0.11, 0.31]
Lithuania	3.68%	0.22 [0.09, 0.35]
Portugal	3.91%	0.23 [0.12, 0.34]
India	3.01%	0.24 [0.06, 0.41]
Italy	3.19%	0.25 [0.09, 0.41]
Chile	3.75%	0.34 [0.22, 0.47]
China	4.26%	0.40 [0.31, 0.49]
RE Model	100.00%	0.14 [0.09, 0.18]

Correlation Coefficient

Figure A2.27. Results of random-effects meta-analysis examining the *zero-order correlation* between a traditionalism composite comprising all items from the Conventionalism and Moral Foundations Authority subscales (including reverse-coded ones) and the COVID-19 health precautions composite. Compare to Figure 1 in the main text.

Study Site		Correlation [95% CI]
Kenya		2.59% -0.07 [-0.23, 0.09]
Indonesia		3.56% 0.01 [-0.11, 0.13]
Canada		3.52% 0.04 [-0.08, 0.16]
United States		4.20% 0.06 [-0.04, 0.16]
Israel		3.81% 0.08 [-0.04, 0.19]
Singapore		2.85% 0.10 [-0.05, 0.25]
Austria		4.17% 0.11 [0.01, 0.21]
Slovakia		3.58% 0.11 [-0.01, 0.23]
Qatar		2.78% 0.12 [-0.04, 0.27]
Poland		5.90% 0.13 [0.08, 0.18]
India		2.54% 0.15 [-0.02, 0.31]
Japan		3.53% 0.15 [0.03, 0.27]
Denmark		4.20% 0.16 [0.06, 0.26]
Netherlands		4.11% 0.17 [0.07, 0.28]
Turkey		4.32% 0.18 [0.08, 0.27]
Philippines		3.58% 0.20 [0.08, 0.32]
Guatemala		4.87% 0.21 [0.13, 0.29]
South Korea		1.86% 0.22 [0.01, 0.42]
U.K.		4.23% 0.22 [0.12, 0.32]
Lithuania		3.64% 0.23 [0.11, 0.35]
Italy		3.06% 0.24 [0.10, 0.38]
Mexico		3.05% 0.24 [0.10, 0.38]
France		3.24% 0.25 [0.12, 0.38]
Spain		4.67% 0.26 [0.18, 0.35]
China		4.49% 0.28 [0.19, 0.37]
Portugal		4.05% 0.29 [0.19, 0.40]
Chile		3.59% 0.32 [0.20, 0.44]
RE Model		100.00% 0.17 [0.14, 0.20]

Semi-Partial Correlation Coefficient

Figure A2.28. Results of random-effects meta-analysis examining the *semi-partial correlation* between a traditionalism composite comprising all items from the Conventionalism and Moral Foundations Authority subscales (including reverse-coded ones) and the COVID-19 health precautions composite after adjusting for the effects of the five suppressor variables. Compare to Figure 3 in the main text.

350
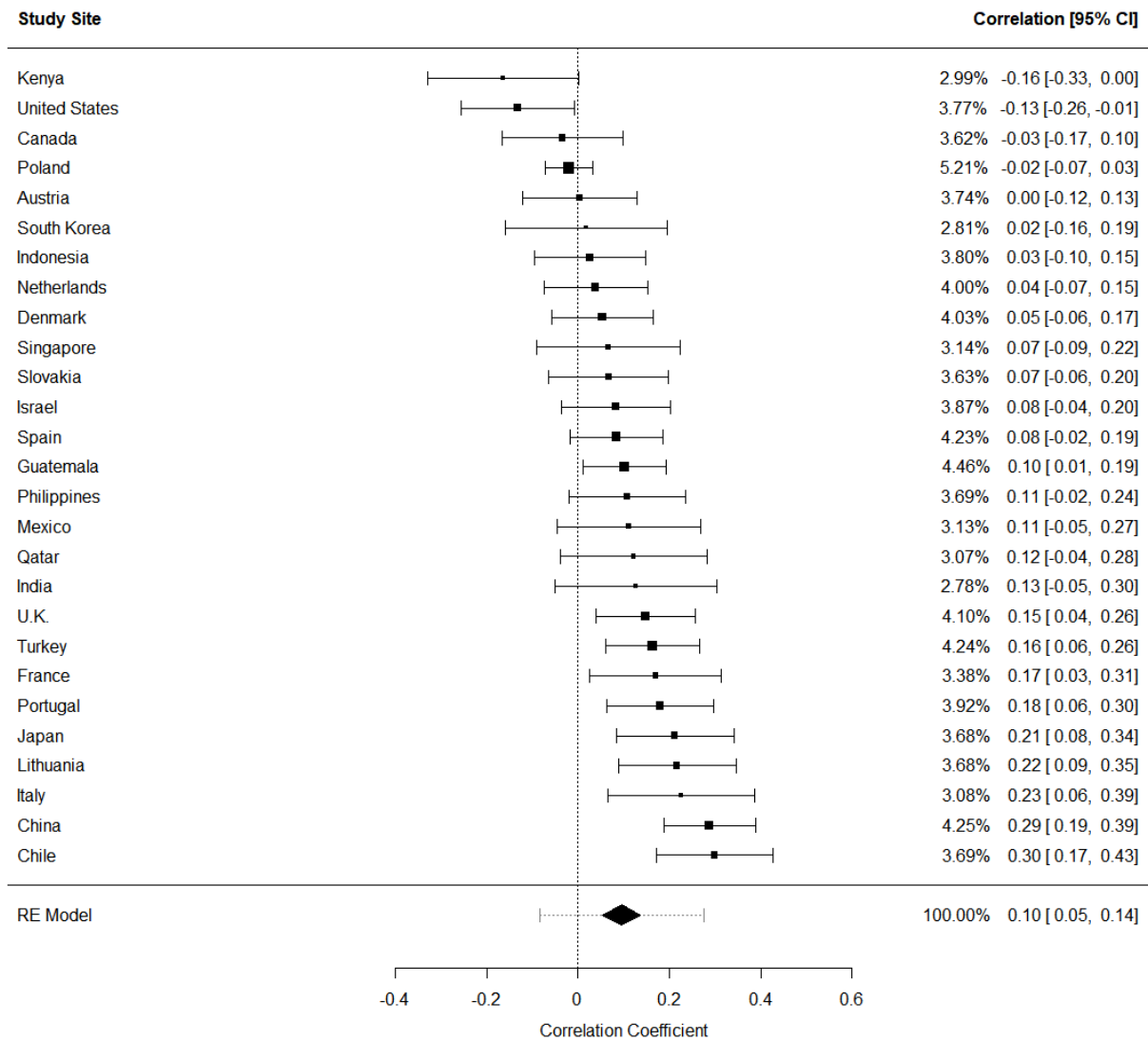
Figure A2.29. Results of random-effects meta-analysis examining the *zero-order correlation* between the Conventionalism subscale and the COVID-19 health precautions composite. Compare to Figure 1 in the main text.
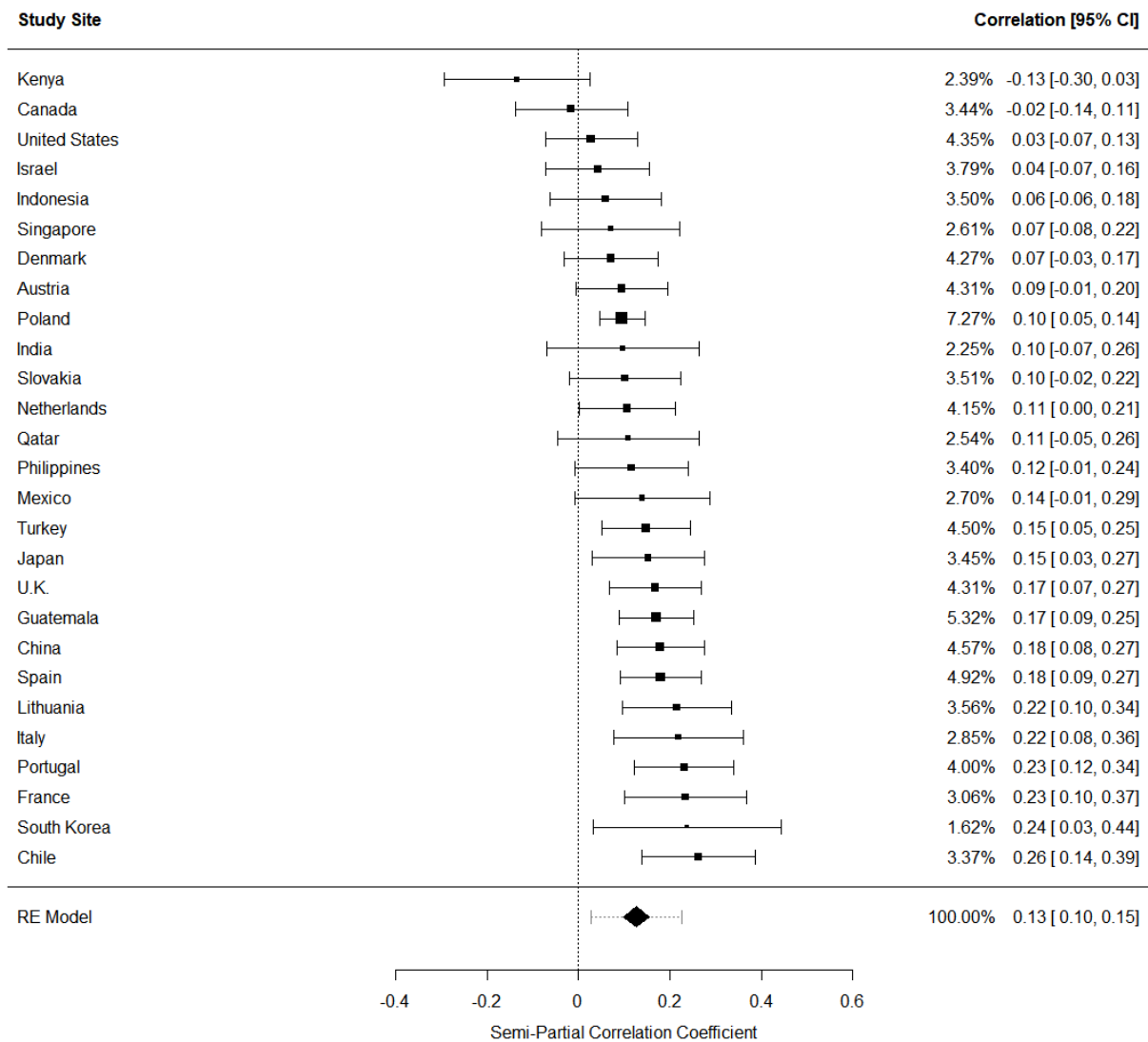
Figure A2.30. Results of random-effects meta-analysis examining the *semi-partial correlation* between the Conventionalism subscale and the COVID-19 health precautions composite after adjusting for the effects of the five suppressor variables. Compare to Figure 3 in the main text.

Study Site		Correlation [95% CI]
Indonesia	3.79%	-0.06 [-0.18, 0.06]
United States	3.71%	-0.05 [-0.17, 0.08]
South Korea	2.78%	-0.02 [-0.20, 0.16]
Austria	3.72%	0.01 [-0.11, 0.14]
Poland	5.22%	0.03 [-0.03, 0.08]
Slovakia	3.60%	0.03 [-0.10, 0.16]
Qatar	3.01%	0.03 [-0.13, 0.20]
Canada	3.61%	0.08 [-0.05, 0.21]
Kenya	2.90%	0.08 [-0.09, 0.25]
Japan	3.57%	0.10 [-0.03, 0.24]
Israel	3.86%	0.11 [-0.01, 0.23]
Singapore	3.15%	0.13 [-0.03, 0.29]
France	3.33%	0.15 [-0.00, 0.29]
Netherlands	4.03%	0.15 [0.04, 0.26]
Guatemala	4.48%	0.16 [0.07, 0.25]
Lithuania	3.60%	0.17 [0.03, 0.30]
Philippines	3.72%	0.18 [0.05, 0.31]
Mexico	3.17%	0.19 [0.04, 0.34]
Turkey	4.25%	0.20 [0.10, 0.30]
Italy	3.02%	0.20 [0.04, 0.37]
U.K.	4.14%	0.21 [0.11, 0.32]
Portugal	3.94%	0.22 [0.11, 0.34]
Spain	4.32%	0.23 [0.13, 0.33]
India	2.88%	0.24 [0.07, 0.41]
Denmark	4.16%	0.26 [0.15, 0.36]
Chile	3.68%	0.31 [0.18, 0.43]
China	4.34%	0.35 [0.26, 0.45]
RE Model	100.00%	0.14 [0.10, 0.18]

Figure A2.31. Results of random-effects meta-analysis examining the *zero-order correlation* between the Moral Foundations Authority subscale and the COVID-19 health precautions composite. Compare to Figure 1 in the main text.

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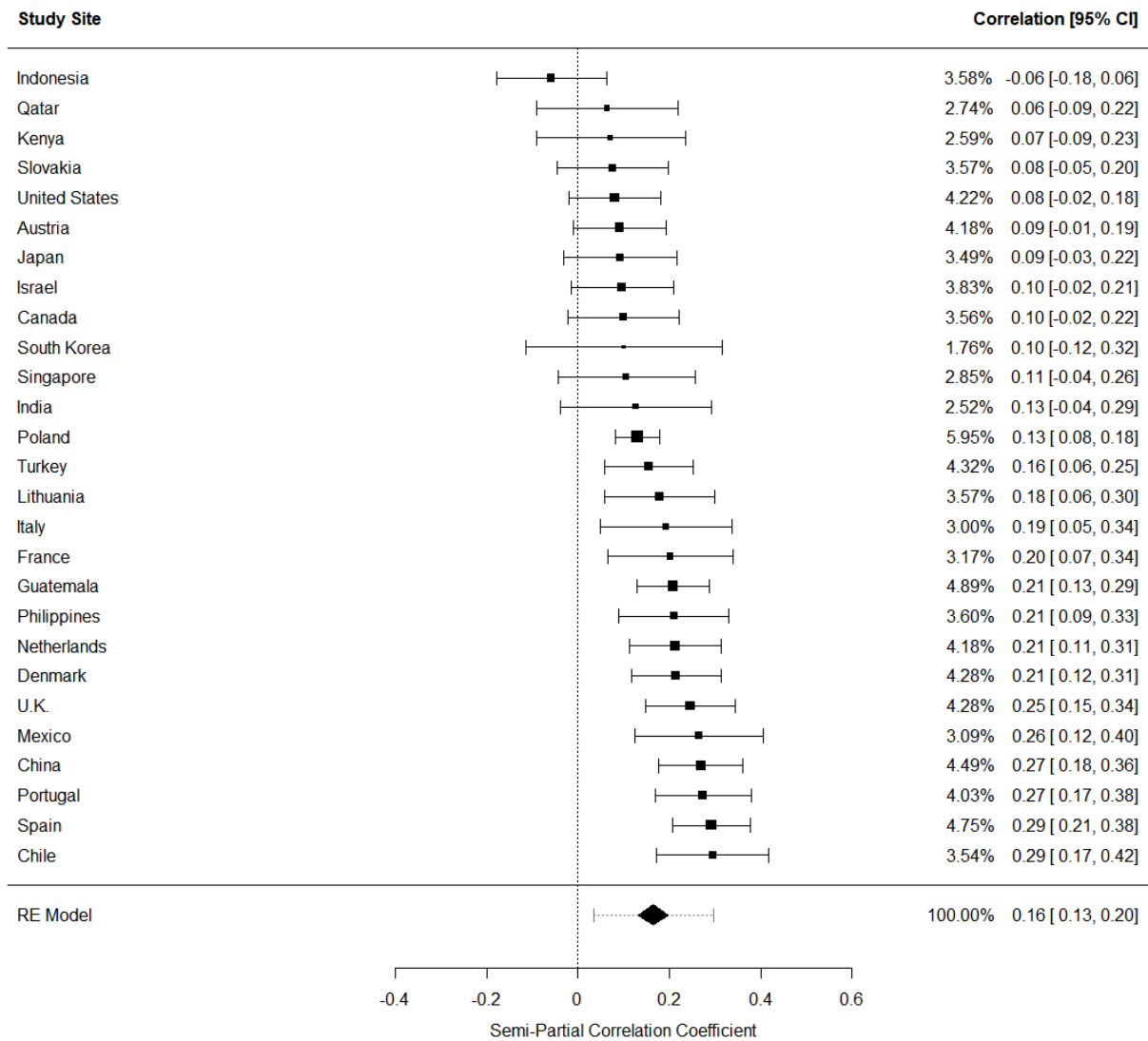
Figure A2.32. Results of random-effects meta-analysis examining the *semi-partial correlation* between the Moral Foundations Authority subscale and the COVID-19 health precautions composite after adjusting for the effects of the five suppressor variables. Compare to Figure 3 in the main text.

10. Traditionalism-precautions relationship using factor scores

In the main text analyses, we used composite variables for traditionalism and COVID-19 precautions that were comprised of raw averages of all the items that loaded onto each respective factor (e.g. traditionalism, internal-facing precautions, etc.). See pages S30 and S38 for details on factor analyses. However, in the main text, we report that using factor scores instead of raw averages in the main text analyses did not conceptually affect the results. Here, we present those results. First, we extracted factor scores for the traditionalism factor, the internal-facing precautions factor, the external-facing precautions factor, and the combined overall public health precautions factor (where all public health precautions items—both external- and internal-facing—load onto a single factor). Then, we examined the correlations between the factor scores, and the composite variables based on raw averages. We fit a series of random-intercepts linear mixed models (estimated using REML) to examine the relationships between the factor scores and composited averages, including country as a random effect. For all four variables, the factor scores were highly correlated with the composited averages, as follows: traditionalism (marginal R2 = .97, β = .98, 95% CI [.97, .98), t(7,304) = 491.55, $p < .001$); internal-facing precautions (marginal R2 = .96, β = .98, 95% CI [.98, .99), t(7,462) = 396.65, $p < .001$); external-facing precautions (marginal R2 = .97, β = .98, 95% CI [.98, .98), t(7,462) = 500.29, $p < .001$); overall public health precautions (marginal R2 = .98, β = .99, 95% CI [.98, .99), t(7,523) = 607.76, $p < .001$).

We then re-analyzed the main text results using the factor scores instead of the composited averages. The relationship between traditionalism and COVID-19 health precautions did not conceptually change as a product of using the factor scores, see Figures S33 and S34. Likewise, the interaction between subscale and traditionalism was conceptually unaltered when using factor scores instead of composited averages (compare to Figure 4 in the main text). Using the factor scores, there was an interaction between health precautions subscale and traditionalism (B = .09, SE = .01, $t(6,993)$ = 10.37, $p < .001$). A simple slopes analysis revealed that the correlation between traditionalism and internal-facing precautions (B = .22, SE = .01, $t(6,993)$ = 20.79, $p < .001$) was about twice as strong as the correlation between traditionalism and external-facing precautions (B = .13, SE = .01, $t(6,993)$ = 12/02, $p < .001$). Note that the factor scores were rescaled to the original 1-7 scale used by participants.
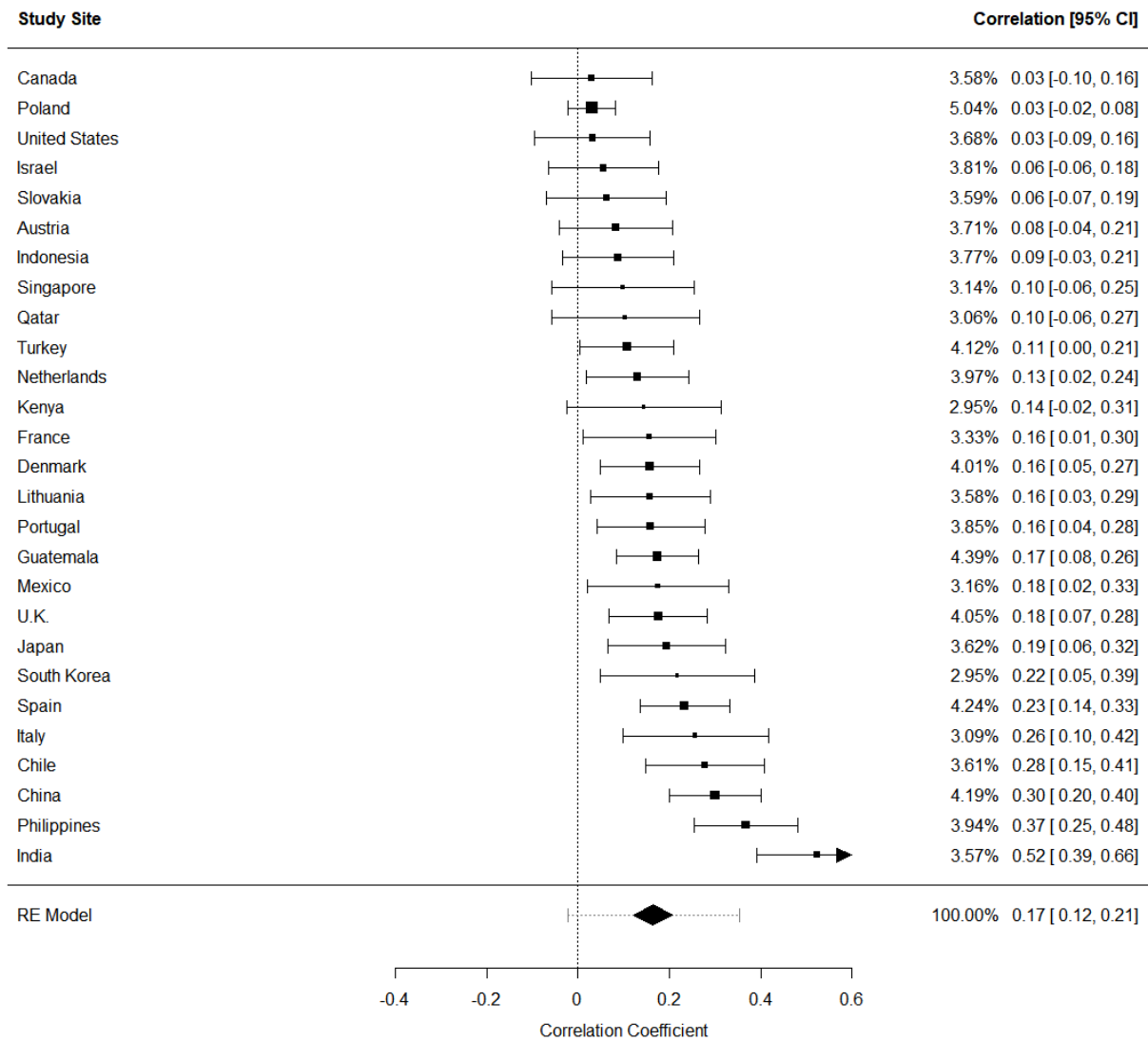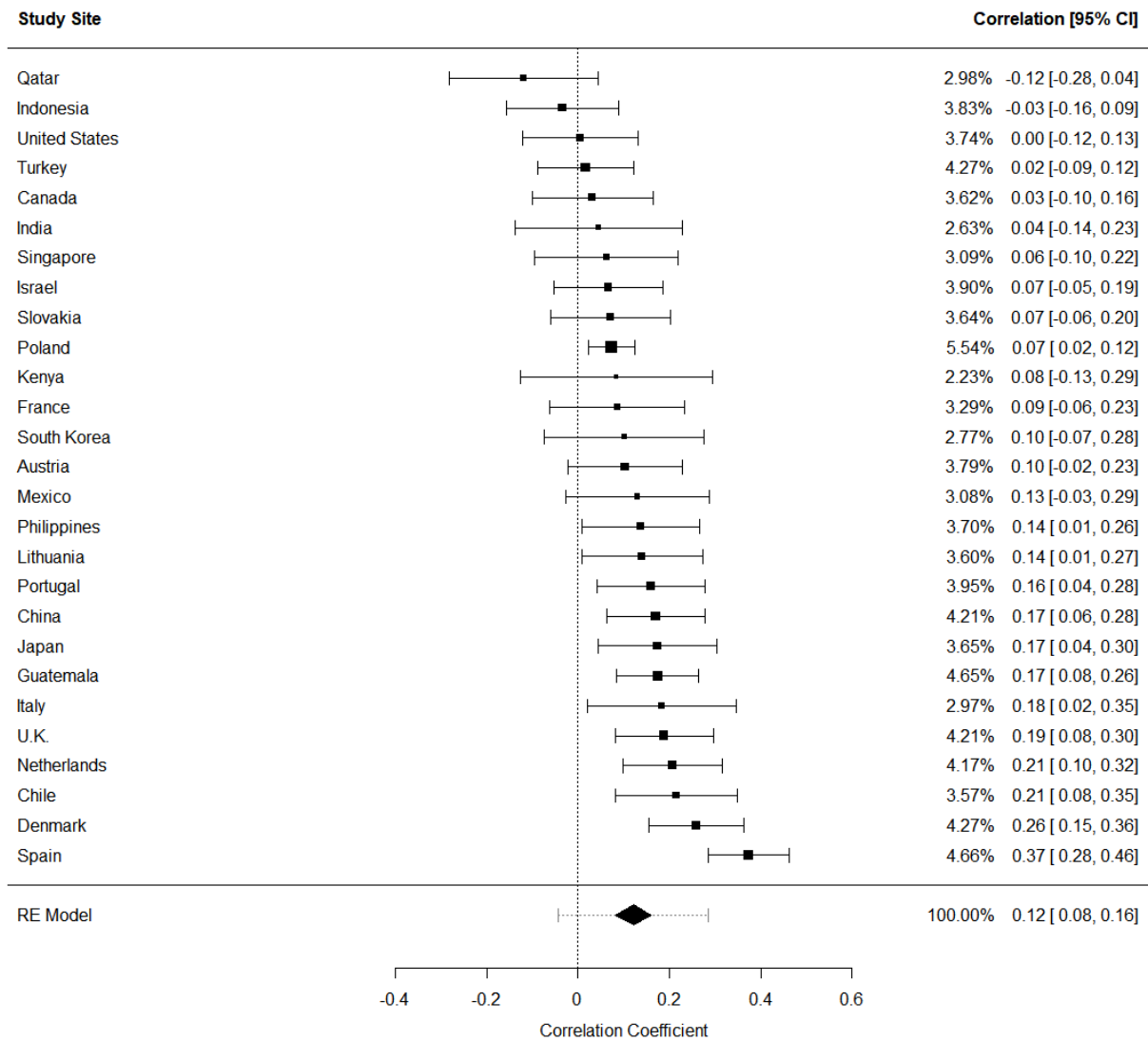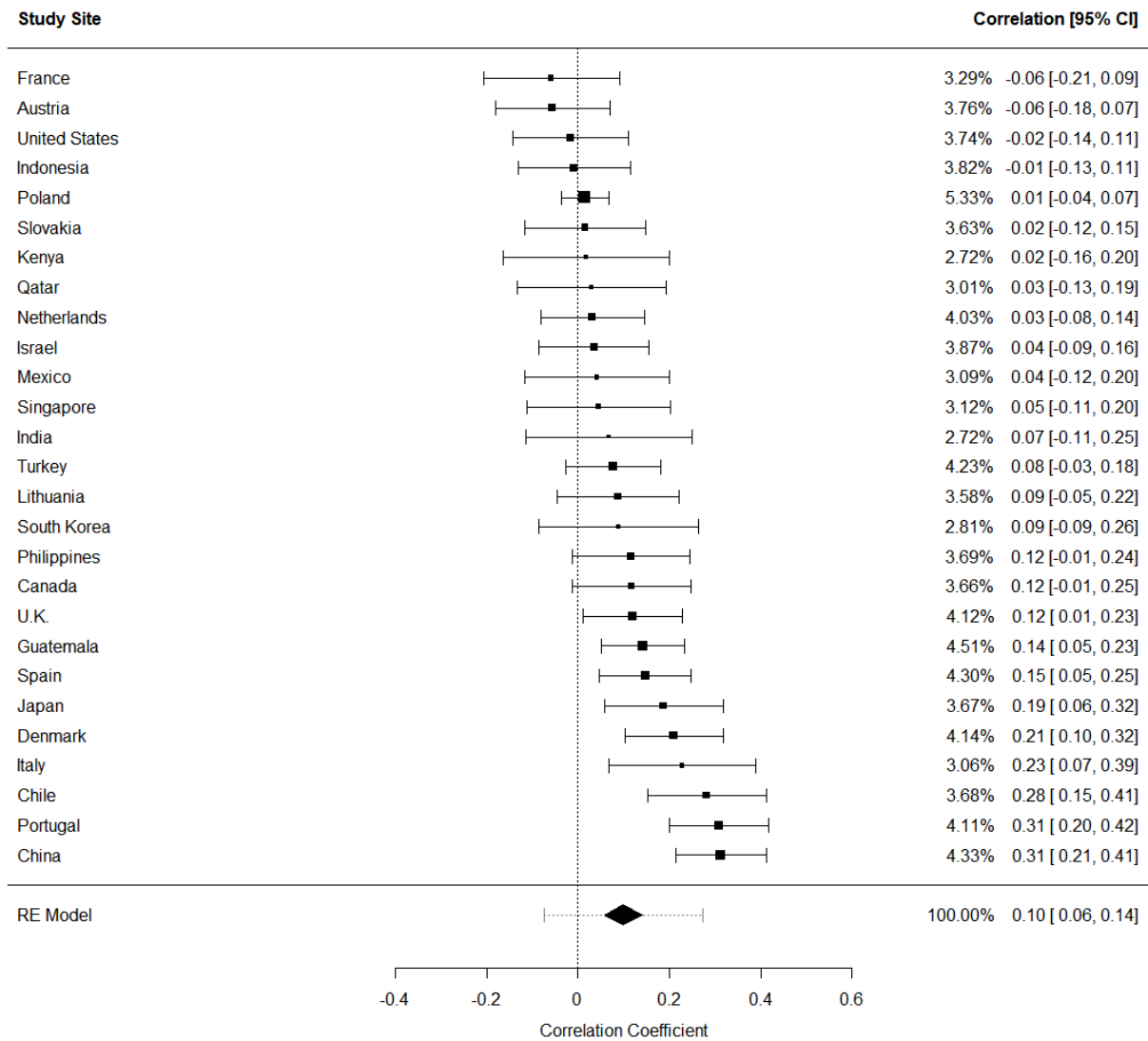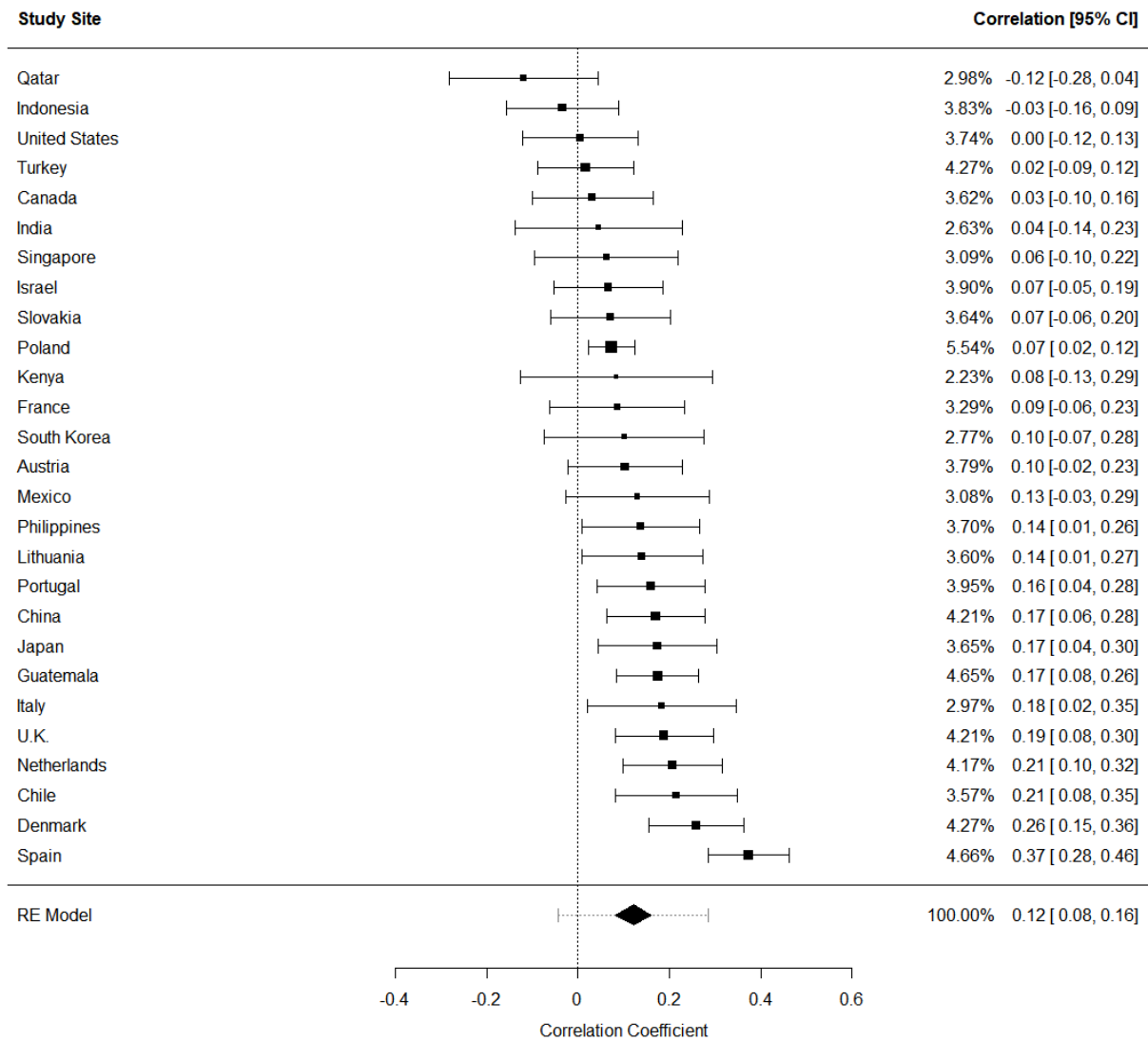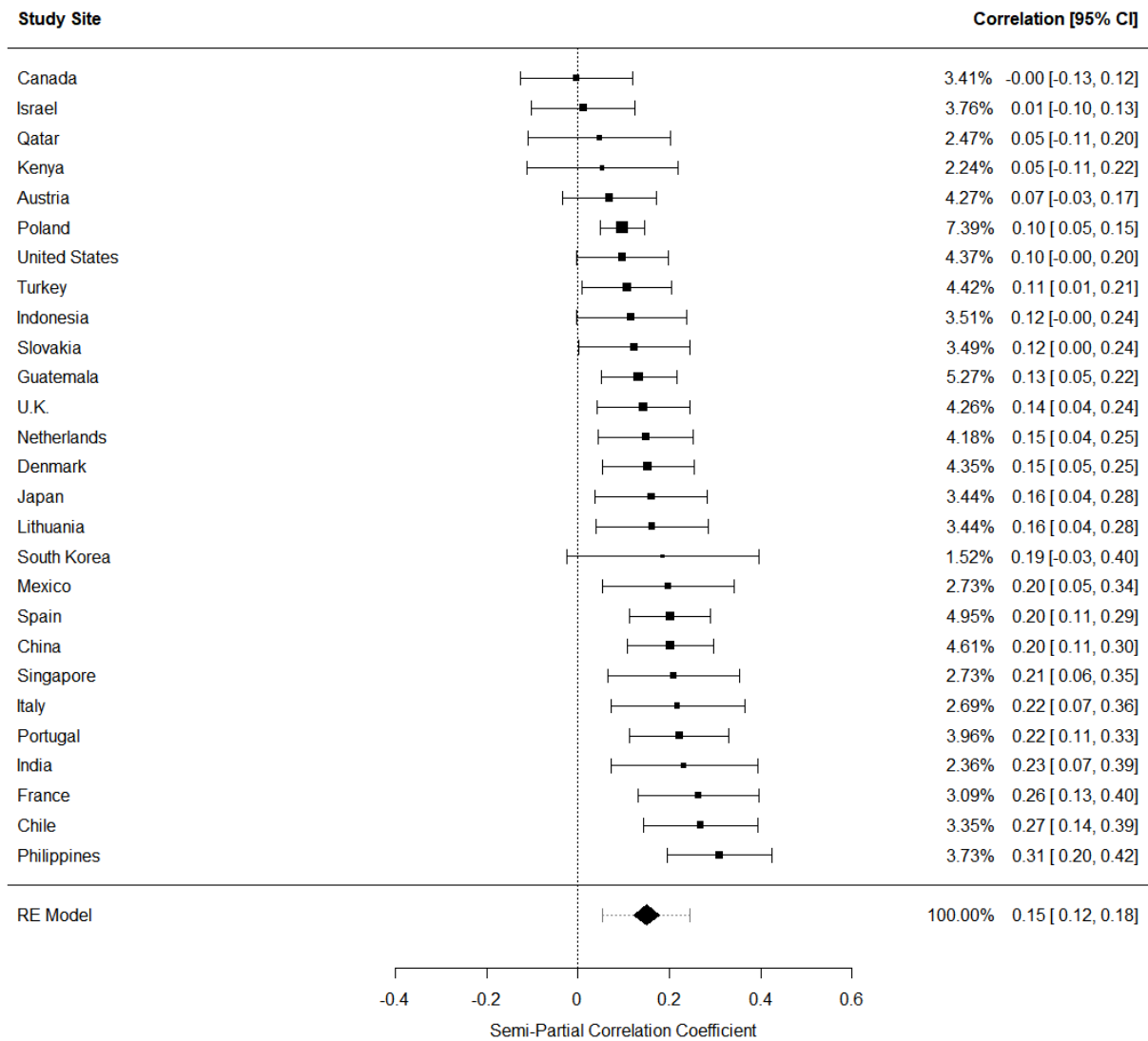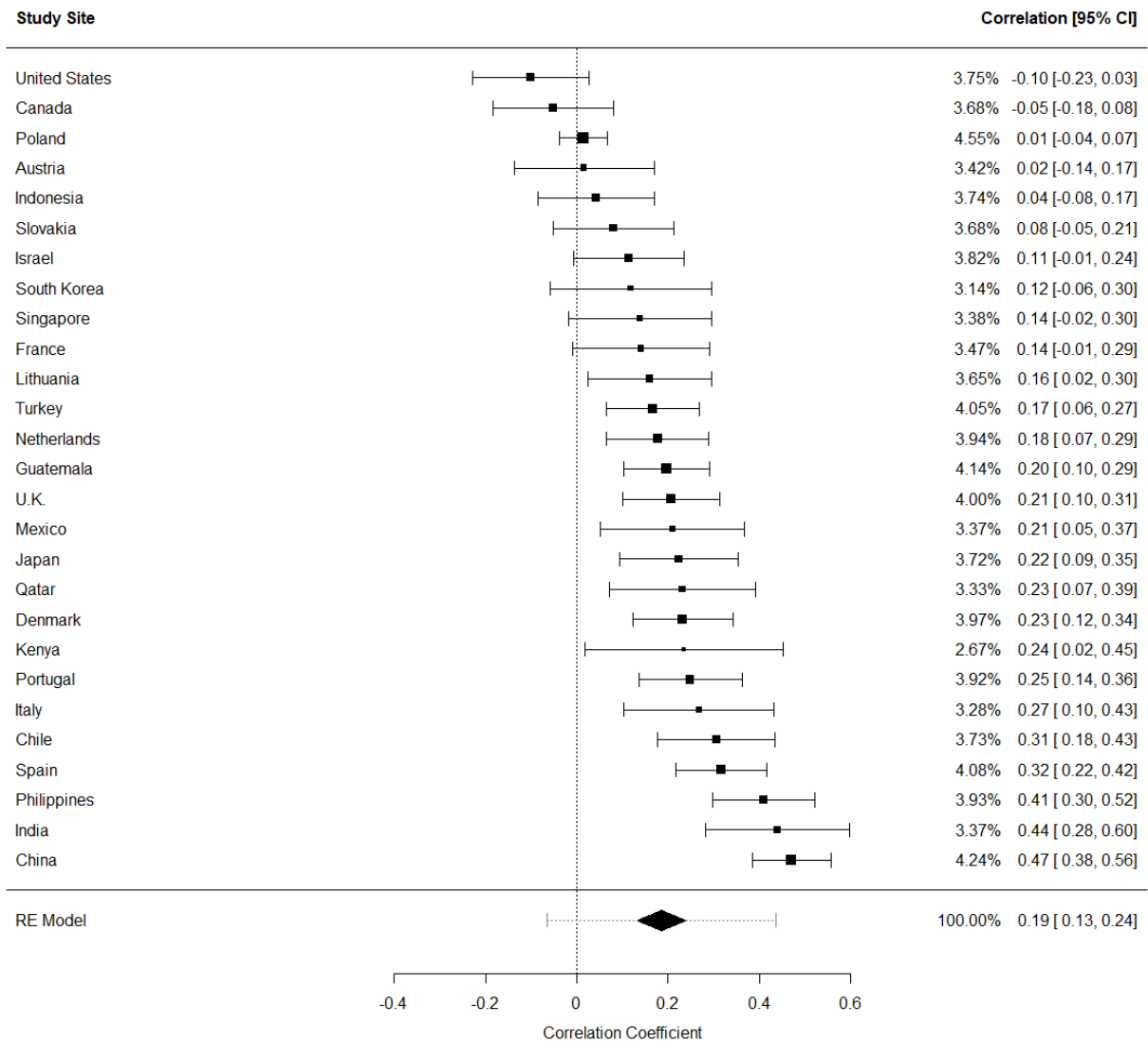
Figure A2.33. Results of random-effects meta-analysis examining the *zero-order correlation* between the traditionalism factor scores and the COVID-19 health precautions factor scores. Compare to Figure 1 in the main text.

Study Site		Correlation [95% CI]
Canada		3.64% 0.05 [-0.07, 0.17]
Indonesia		3.53% 0.06 [-0.07, 0.18]
Israel		3.83% 0.08 [-0.03, 0.20]
United States		4.25% 0.11 [0.01, 0.21]
Austria		3.59% 0.12 [-0.01, 0.24]
Kenya		1.95% 0.12 [-0.09, 0.33]
Singapore		2.96% 0.14 [-0.01, 0.29]
Slovakia		3.66% 0.14 [0.02, 0.26]
Denmark		4.16% 0.16 [0.06, 0.26]
Poland		5.78% 0.16 [0.11, 0.21]
Japan		3.64% 0.17 [0.05, 0.29]
Qatar		2.86% 0.18 [0.02, 0.33]
Turkey		4.35% 0.18 [0.08, 0.28]
Lithuania		3.56% 0.19 [0.06, 0.31]
Guatemala		4.70% 0.22 [0.13, 0.30]
France		3.23% 0.23 [0.09, 0.37]
Mexico		3.05% 0.24 [0.09, 0.38]
Netherlands		4.21% 0.24 [0.14, 0.34]
Italy		2.95% 0.25 [0.10, 0.40]
U.K.		4.34% 0.27 [0.17, 0.36]
Portugal		4.11% 0.28 [0.18, 0.39]
South Korea		2.05% 0.28 [0.08, 0.49]
China		4.57% 0.31 [0.22, 0.40]
India		2.80% 0.32 [0.16, 0.47]
Chile		3.71% 0.33 [0.21, 0.45]
Spain		4.59% 0.35 [0.26, 0.44]
Philippines		3.92% 0.38 [0.27, 0.49]
RE Model		100.00% 0.21 [0.17, 0.24]

Semi-Partial Correlation Coefficient

Figure A2.34. Results of random-effects meta-analysis examining the *semi-partial correlation* between the traditionalism factor scores and the COVID-19 health precautions factor scores after adjusting for the effects of the five suppressor variables. Compare to Figure 3 in the main text.
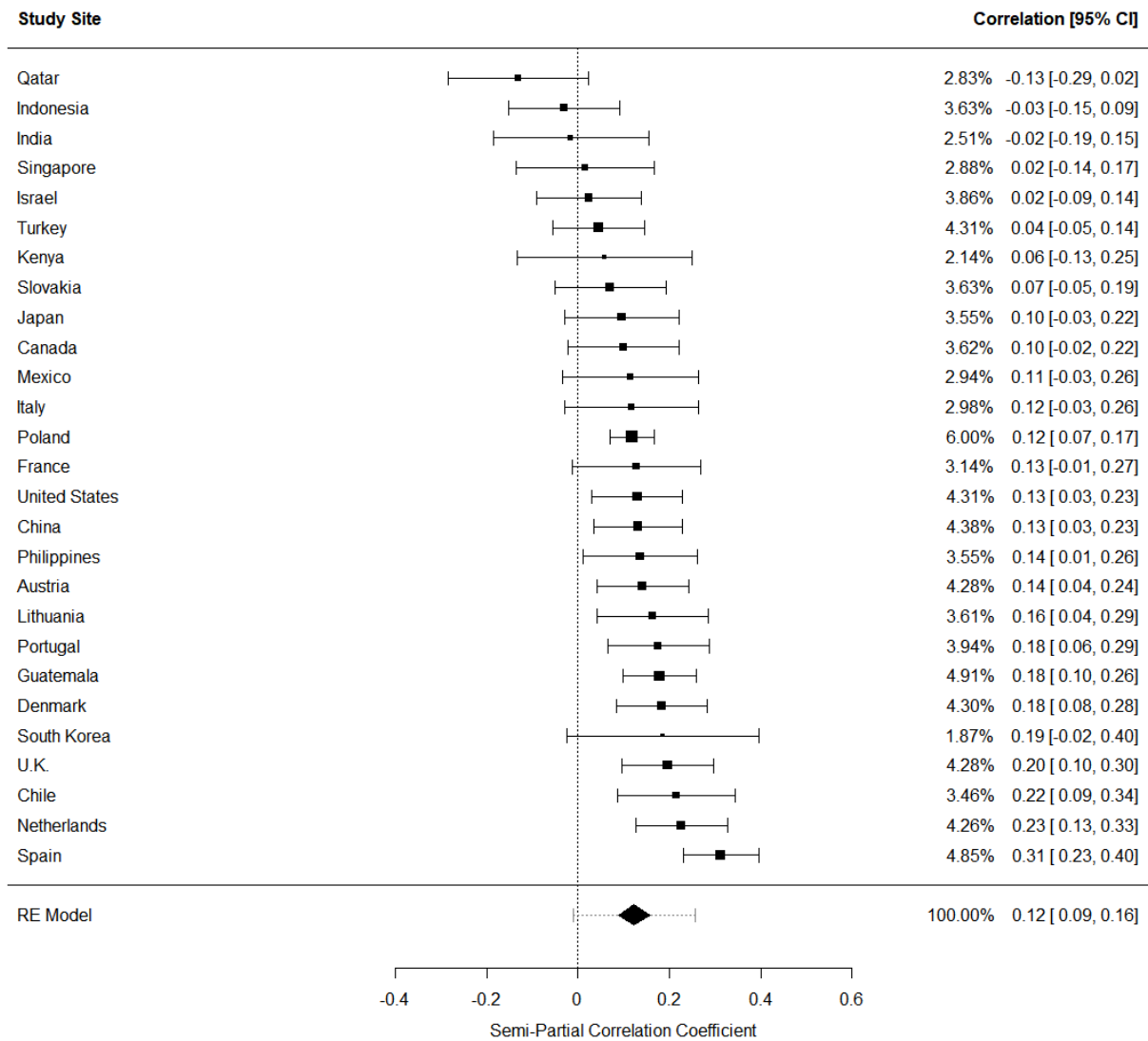
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11. Suppressor variable descriptives by country

In order to understand the distribution of attitudes measured by the suppressor variables (trust in scientists, social dominance orientation, and the perception of tradeoffs between COVID-19 precautions on the one hand, and personal liberties, the economy, and one's traditions respectively on the other), we assessed mean response levels of those variables across the countries in the sample using random-effects meta-analyses of those means. Results indicate variability across nations in mean responses along the five suppressor variables (see figures S37-S41).

Trust in scientists:

Turkey	⊢■⊣	3.74%	4.43 [4.28, 4.57]
Spain	⊢■⊣	3.67%	4.47 [4.28, 4.66]
Kenya	⊢·─⊣	3.55%	4.64 [4.38, 4.89]
Qatar	⊢·─⊣	3.59%	4.72 [4.48, 4.96]
India	⊢·─⊣	3.53%	4.74 [4.47, 5.00]
Israel	⊢■⊣	3.72%	4.96 [4.80, 5.11]
Austria	⊢·─⊣	3.65%	4.98 [4.78, 5.19]
Poland	■	3.80%	4.99 [4.92, 5.07]
Guatemala	⊢■⊣	3.75%	5.00 [4.87, 5.14]
Japan	⊢■⊣	3.74%	5.08 [4.94, 5.22]
Denmark	⊢■⊣	3.73%	5.17 [5.03, 5.32]
Philippines	⊢■⊣	3.70%	5.26 [5.09, 5.43]
France	⊢■⊣	3.71%	5.34 [5.17, 5.50]
South Korea	⊢■⊣	3.72%	5.37 [5.21, 5.52]
Canada	⊢■⊣	3.72%	5.44 [5.29, 5.60]
Indonesia	⊢■⊣	3.76%	5.47 [5.34, 5.59]
Netherlands	⊢■⊣	3.75%	5.48 [5.35, 5.62]
Singapore	⊢■⊣	3.73%	5.49 [5.34, 5.64]
Lithuania	⊢■⊣	3.67%	5.54 [5.35, 5.73]
Italy	⊢·■⊣	3.63%	5.65 [5.44, 5.86]
U.K.	⊢■⊣	3.75%	5.69 [5.56, 5.82]
Slovakia	⊢■⊣	3.72%	5.76 [5.60, 5.91]
Chile	⊢■⊣	3.73%	5.76 [5.61, 5.91]
Mexico	⊢■⊣	3.64%	5.80 [5.59, 6.00]
United States	⊢■⊣	3.72%	5.85 [5.70, 6.01]
China	⊢■⊣	3.79%	6.06 [5.97, 6.16]
Portugal	⊢■⊣	3.77%	6.25 [6.14, 6.36]
RE Model	◆	100.00%	5.31 [5.13, 5.49]

1   2   3   4   5   6   7
Mean

Figure A2.35. Random-effects meta-analysis of mean level of trust in scientists at each study site. Trust in scientists was measured along a 1-7 scale. Refer to Figure 1 for details on interpreting forest plots.

Note that samples were not nationally representative, and that sampling procedures differed across study sites, and thus that it would not be appropriate to draw strong inferences about differences between societies on the dimension measured here.

Social dominance orientation:

United States	3.72%	1.84 [1.73, 1.96]
Canada	3.71%	1.88 [1.74, 2.01]
Italy	3.66%	1.91 [1.75, 2.07]
Slovakia	3.69%	1.96 [1.82, 2.10]
U.K.	3.73%	1.96 [1.85, 2.07]
Kenya	3.60%	1.98 [1.78, 2.18]
Spain	3.73%	2.00 [1.89, 2.11]
Portugal	3.73%	2.01 [1.89, 2.12]
China	3.74%	2.04 [1.93, 2.14]
Mexico	3.70%	2.05 [1.92, 2.19]
Chile	3.69%	2.11 [1.96, 2.26]
Singapore	3.69%	2.12 [1.97, 2.26]
Lithuania	3.69%	2.14 [1.99, 2.28]
France	3.68%	2.14 [1.99, 2.29]
Qatar	3.67%	2.16 [2.00, 2.32]
Indonesia	3.72%	2.18 [2.06, 2.29]
Guatemala	3.74%	2.19 [2.08, 2.29]
Poland	3.77%	2.23 [2.17, 2.29]
Austria	3.72%	2.26 [2.14, 2.38]
Philippines	3.69%	2.27 [2.12, 2.41]
Israel	3.71%	2.41 [2.28, 2.53]
Netherlands	3.73%	2.53 [2.42, 2.64]
South Korea	3.68%	2.69 [2.54, 2.84]
Denmark	3.71%	2.75 [2.62, 2.89]
India	3.61%	2.80 [2.60, 3.00]
Turkey	3.75%	3.16 [3.07, 3.25]
Japan	3.74%	3.89 [3.79, 3.98]
RE Model	100.00%	2.28 [2.11, 2.45]

Figure A2.36. Random-effects meta-analysis of mean level of social dominance orientation at each study site. SDO was measured along a 1-7 scale. Refer to Figure 1 for details on interpreting forest plots.

Note that samples were not nationally representative, and that sampling procedures differed across study sites, and thus that it would not be appropriate to draw strong inferences about differences between societies on the dimension measured here.

Perceived tradeoff between COVID-19 precautions and personal liberties:

United States	3.72%	2.05 [1.84, 2.26]
Singapore	3.69%	2.54 [2.30, 2.79]
South Korea	3.74%	2.57 [2.37, 2.77]
Lithuania	3.70%	2.80 [2.56, 3.03]
Canada	3.71%	2.88 [2.65, 3.10]
Portugal	3.74%	2.91 [2.71, 3.10]
Netherlands	3.74%	2.91 [2.72, 3.10]
U.K.	3.74%	3.03 [2.85, 3.22]
Austria	3.69%	3.08 [2.84, 3.32]
Denmark	3.73%	3.27 [3.07, 3.48]
Indonesia	3.72%	3.32 [3.11, 3.53]
Italy	3.63%	3.37 [3.08, 3.66]
Slovakia	3.71%	3.39 [3.16, 3.62]
Israel	3.73%	3.55 [3.35, 3.75]
Kenya	3.54%	3.62 [3.26, 3.98]
France	3.69%	3.62 [3.38, 3.86]
India	3.62%	3.78 [3.48, 4.08]
Philippines	3.69%	3.79 [3.55, 4.03]
China	3.71%	3.90 [3.68, 4.12]
Spain	3.71%	3.90 [3.68, 4.13]
Mexico	3.66%	3.93 [3.66, 4.19]
Poland	3.81%	4.01 [3.92, 4.10]
Chile	3.65%	4.16 [3.89, 4.44]
Japan	3.74%	4.18 [3.99, 4.37]
Qatar	3.68%	4.28 [4.02, 4.53]
Guatemala	3.76%	4.34 [4.17, 4.51]
Turkey	3.76%	4.74 [4.56, 4.91]
RE Model	100.00%	3.48 [3.24, 3.72]
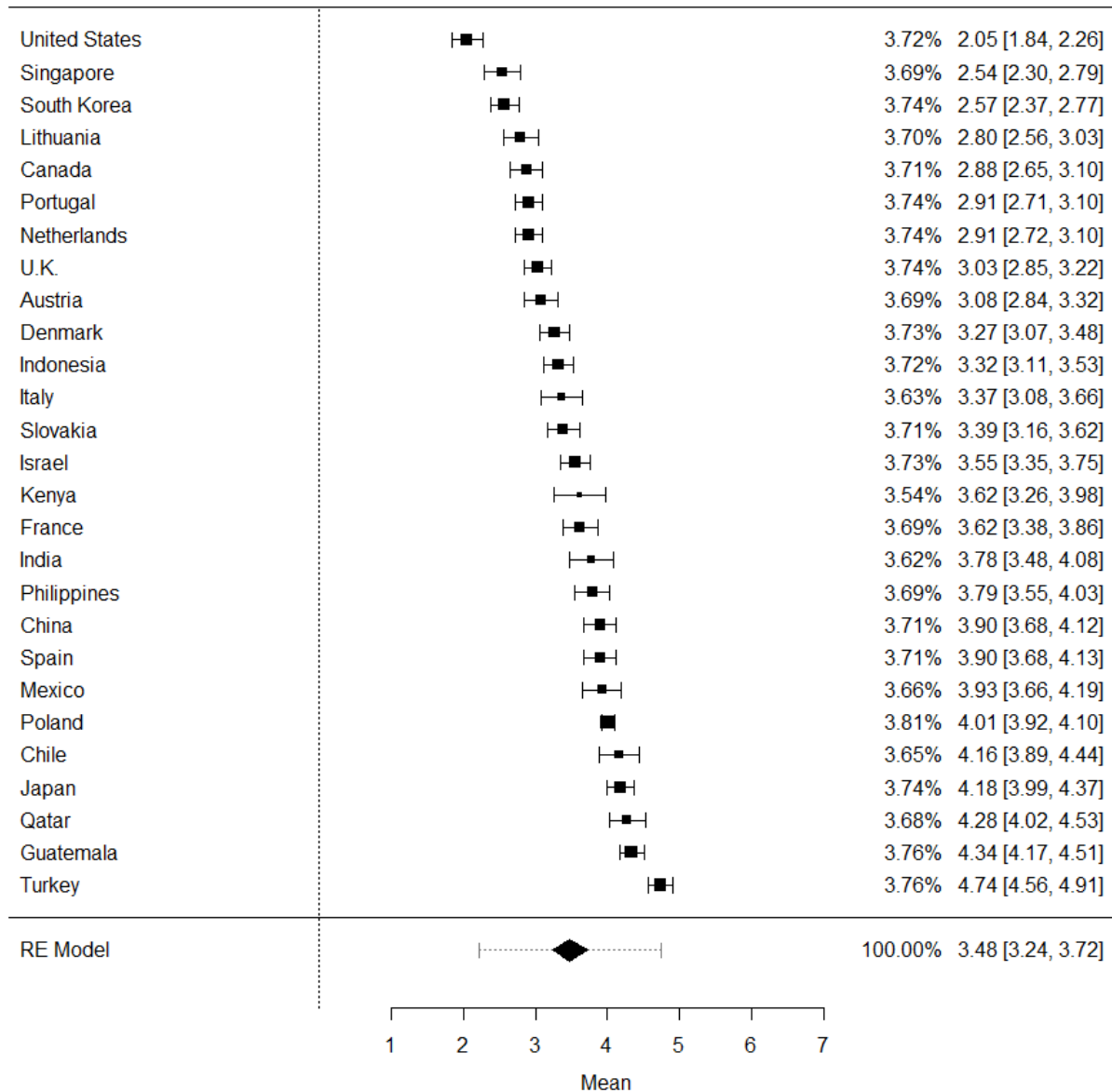
Figure A2.37. Random-effects meta-analysis of mean level of perceived tradeoffs between COVID-19 precautions and personal liberties at each study site. Tradeoffs were measured along a 1-7 scale. Refer to Figure 1 for details on interpreting forest plots.
Note that samples were not nationally representative, and that sampling procedures differed across study sites, and thus that it would not be appropriate to draw strong inferences about differences between societies on the dimension measured here.

Perceived tradeoff between COVID-19 precautions and the economy:

United States		3.71% 2.28 [2.06, 2.50]
Singapore		3.73% 2.36 [2.16, 2.56]
South Korea		3.72% 2.79 [2.58, 3.00]
Lithuania		3.71% 2.93 [2.71, 3.15]
U.K.		3.74% 3.01 [2.83, 3.19]
Portugal		3.73% 3.02 [2.83, 3.21]
Netherlands		3.74% 3.05 [2.87, 3.23]
Canada		3.71% 3.12 [2.90, 3.34]
France		3.70% 3.26 [3.03, 3.49]
Austria		3.70% 3.39 [3.15, 3.62]
Denmark		3.73% 3.55 [3.35, 3.75]
Philippines		3.70% 3.61 [3.37, 3.85]
Italy		3.62% 3.69 [3.38, 4.00]
Indonesia		3.72% 3.70 [3.50, 3.91]
Spain		3.71% 3.97 [3.74, 4.19]
Slovakia		3.71% 3.97 [3.75, 4.20]
Poland		3.79% 4.06 [3.97, 4.15]
Kenya		3.57% 4.08 [3.72, 4.43]
India		3.63% 4.12 [3.82, 4.42]
Chile		3.67% 4.18 [3.92, 4.45]
Mexico		3.62% 4.24 [3.93, 4.55]
Israel		3.73% 4.29 [4.09, 4.48]
China		3.70% 4.33 [4.10, 4.57]
Qatar		3.66% 4.34 [4.07, 4.61]
Japan		3.73% 4.41 [4.21, 4.60]
Guatemala		3.75% 4.65 [4.49, 4.82]
Turkey		3.75% 5.04 [4.86, 5.22]
RE Model		100.00% 3.68 [3.42, 3.95]

Mean: 1 2 3 4 5 6 7
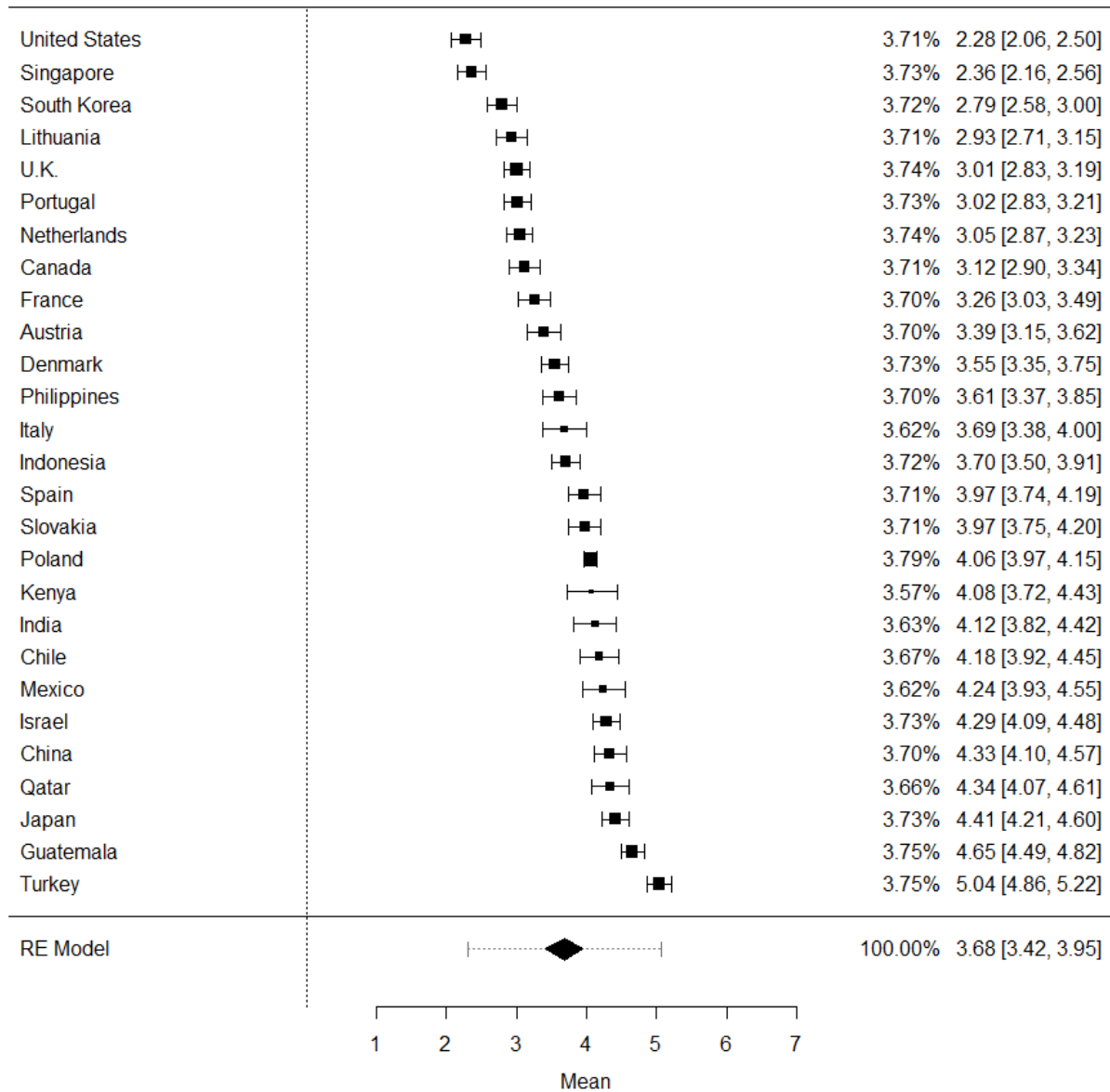
Figure A2.38. Random-effects meta-analysis of mean level of perceived tradeoffs between COVID-19 precautions and the economy at each study site. Tradeoffs were measured along a 1-7 scale. Refer to Figure 1 for details on interpreting forest plots.

Note that samples were not nationally representative, and that sampling procedures differed across study sites, and thus that it would not be appropriate to draw strong inferences about differences between societies on the dimension measured here.

Perceived tradeoff between COVID-19 precautions and one's traditions:

Portugal	3.80%	1.44 [1.32, 1.57]
Lithuania	3.77%	1.63 [1.48, 1.79]
Italy	3.68%	1.64 [1.42, 1.85]
Netherlands	3.78%	1.66 [1.52, 1.80]
Mexico	3.67%	1.67 [1.44, 1.90]
United States	3.73%	1.74 [1.56, 1.92]
Turkey	3.76%	1.75 [1.59, 1.91]
Indonesia	3.77%	1.77 [1.62, 1.92]
Slovakia	3.75%	1.77 [1.60, 1.94]
South Korea	3.74%	1.78 [1.60, 1.96]
Singapore	3.71%	1.79 [1.59, 1.99]
Chile	3.71%	1.82 [1.62, 2.01]
Spain	3.75%	1.84 [1.67, 2.01]
Denmark	3.74%	1.94 [1.76, 2.13]
U.K.	3.76%	1.96 [1.80, 2.11]
Guatemala	3.78%	2.00 [1.86, 2.15]
Canada	3.71%	2.14 [1.94, 2.34]
Austria	3.70%	2.16 [1.95, 2.36]
Israel	3.70%	2.21 [2.01, 2.42]
Kenya	3.56%	2.22 [1.92, 2.51]
France	3.67%	2.28 [2.05, 2.50]
Poland	3.83%	2.65 [2.56, 2.74]
Philippines	3.63%	2.80 [2.55, 3.05]
China	3.64%	2.88 [2.63, 3.13]
Japan	3.67%	3.06 [2.84, 3.29]
Qatar	3.56%	3.16 [2.87, 3.45]
India	3.42%	3.50 [3.14, 3.86]
RE Model	100.00%	2.11 [1.91, 2.31]
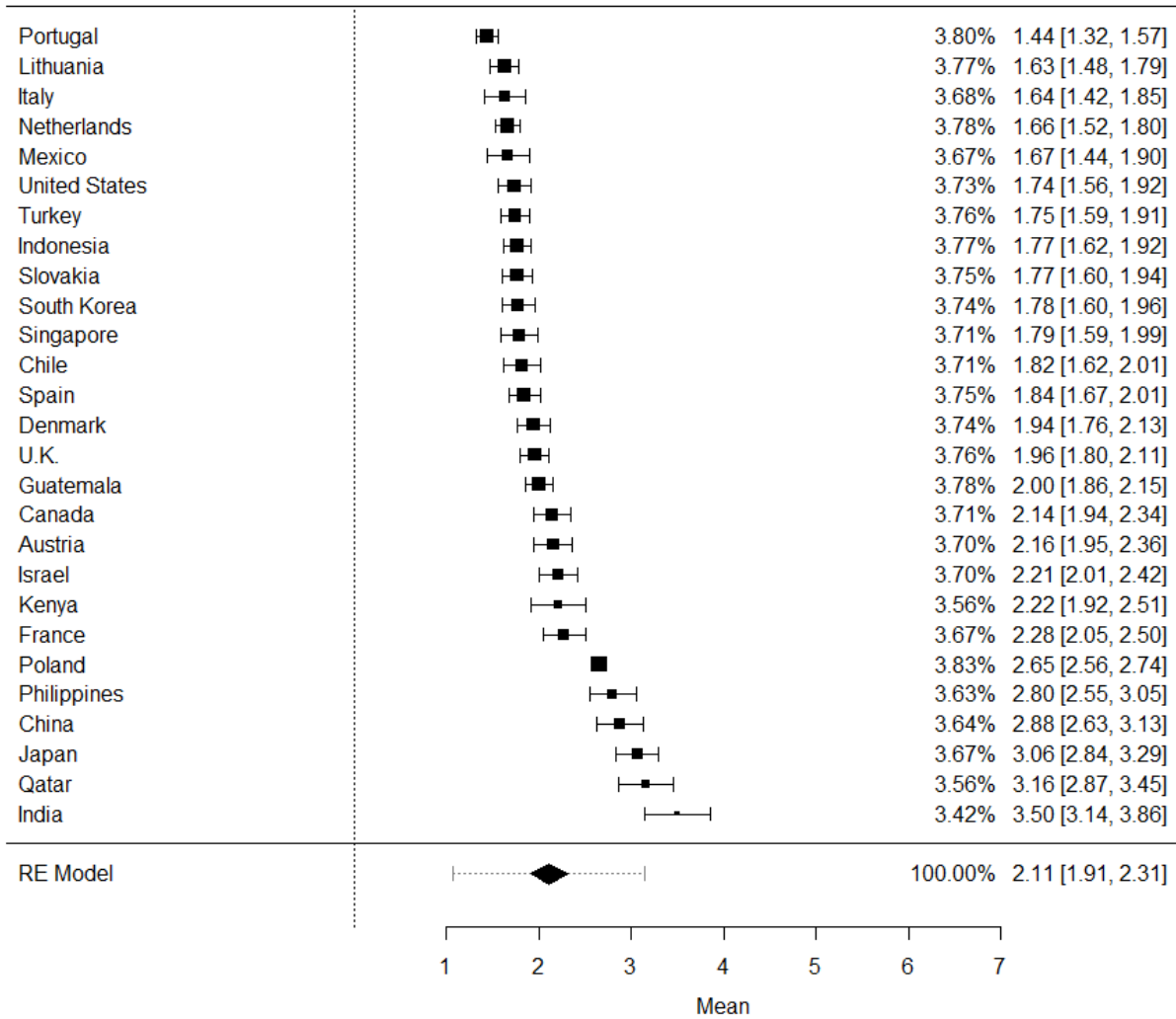
Figure A2.39. Random-effects meta-analysis of mean level of perceived tradeoffs between COVID-19 precautions and one's traditions at each study site. Tradeoffs were measured along a 1-7 scale. Refer to Figure 1 for details on interpreting forest plots.
Note that samples were not nationally representative, and that sampling procedures differed across study sites, and thus that it would not be appropriate to draw strong inferences about differences between societies on the dimension measured here.
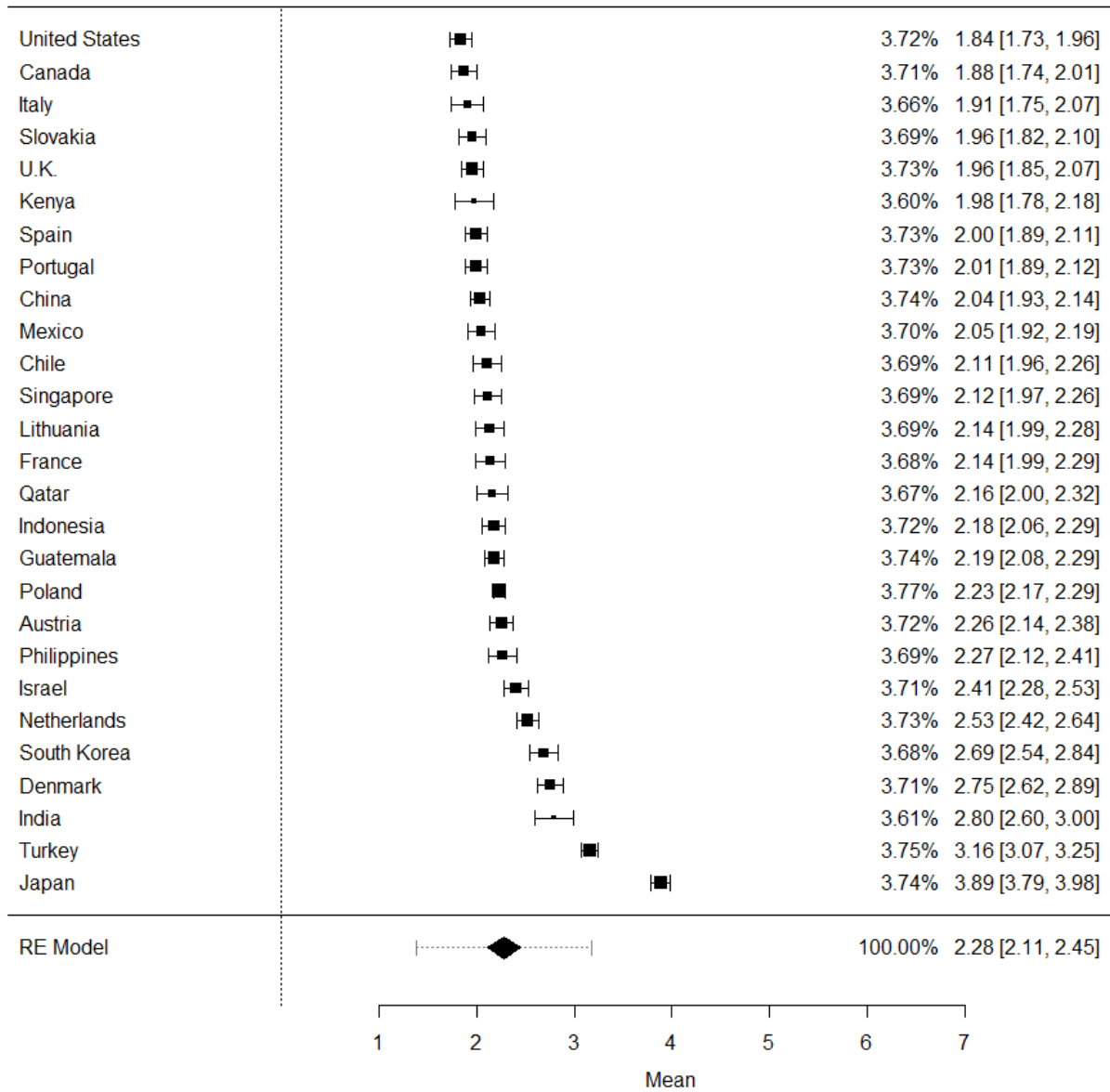
Additional Analyses

1. COVID-19 precautions and gender

        Given the literature on sex differences and disgust [see 39 for an overview], we assessed whether self-reported COVID-19 precautions differed as a function of gender (participants were asked about their gender, not their sex assigned at birth, however the two are likely strongly correlated in our sample). First, we visualized differences in mean COVID-19 precautions between women and men across all 27 countries in the sample (Figure A2.35). Then, we meta-analyzed the mean precautions difference between women and men (see Figure A2.36). Overall, pooling across all countries, women report taking more precautions than men on average (see overall meta-analyzed estimate in Figure A2.36). However, the magnitude of the difference varies across countries (range = -.02-.88; I^2 = .39; 95% prediction intervals = .10-.55), and the difference is statistically significant in 14 of 27 countries. This suggests that while women may have tended to take more COVID-19 precautions than men overall, the precise pattern varies across nations.
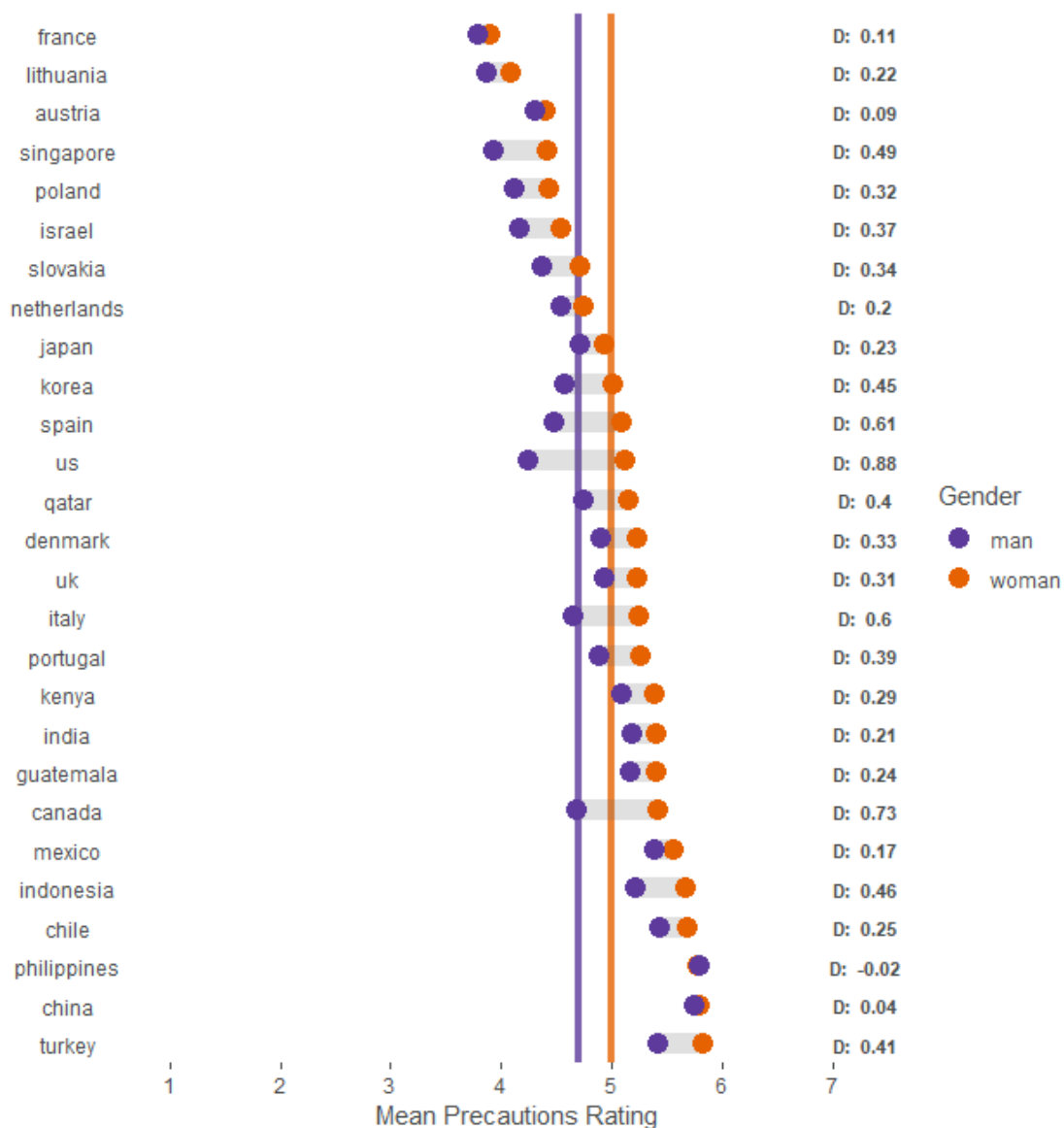
Figure A2.40. Plot of gender differences in COVID-19 precautions by country. Countries are along the y-axis, the mean precautions rating on a scale from 1-7 on the x-axis. The vertical lines represent the unweighted average precautions rating pooling across all countries. The dots represent the average precautions rating for women and men respectively for each study site, while the grey bars illustrate the distance between those two means. Along the right-hand column, the difference along the 1-7 scale between the women and men means are displayed numerically.
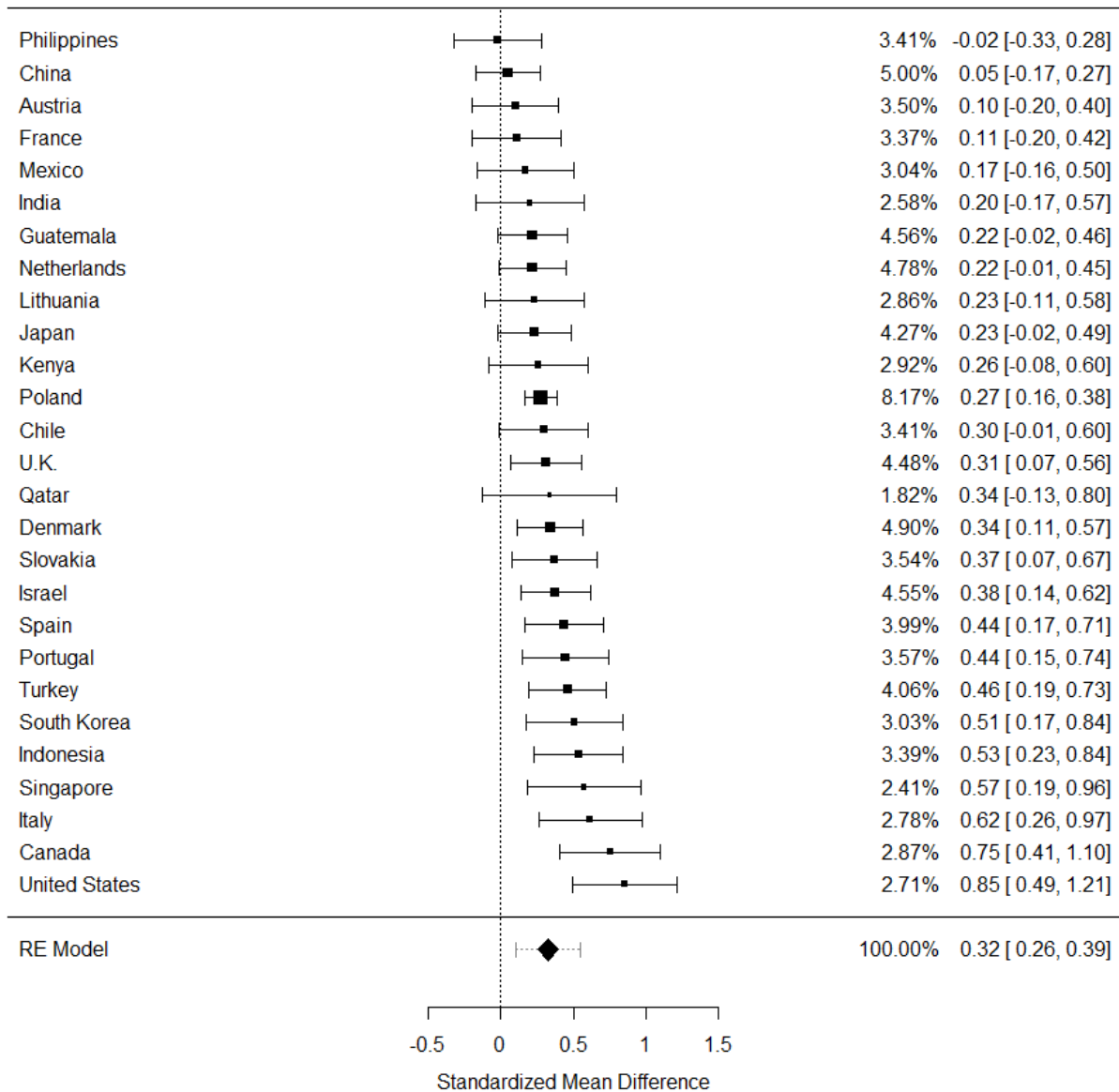
Figure A2.41. Meta-analysis of the standardized mean difference (accounting for heteroscedastic population variances[40]) in COVID-19 precautions between women and men by country. Refer to Figure 1 for details on interpreting forest plots.

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APPENDIX 3

Chapter 3 Supplementary Materials

Supplementary Procedure

1. Composite scales and other variables

Full survey items in English can be found in the open archives, as well as all translations.

COVID-19 Public Health Precautions Composite: Composite of both external- and internal-facing precautions.

Note that although the following item—"When you leave your home and may be near other people, how often do you wear gloves"—was included as a precaution item in the survey, it did not load onto either factor, and therefore was not included in any composite.

Internal-facing precautions:

Compared to before the pandemic, how important has it been for you to have adequate supplies of... [1 – not at all important … 7 – extremely important]

4. Cleaning supplies (such as bleach, disinfectant spray, disinfectant wipes, etc.)
5. Hand sanitizer/hand soap
6. Masks and gloves

Compared to before the pandemic, how important has been for you to… [1 – not at all important … 7 – extremely important]

4. Clean your hands with soap or sanitizer
5. Disinfect surfaces in your house, like doorknobs or counters
6. Eat or drink things to boost your immune system

When you leave your home and may be near other people, how often do you each of the following? [1 – never … 7 – as often as possible]

2. Disinfect surfaces upon returning home

External-facing precautions:

When you leave your home and may be near other people, how often do you each of the following? [1 – never … 7 – as often as possible]

9. Wear a mask and/or face shield/visor
10. Stay farther than 2 meters/6 feet away from people [*note: unit of distance varied according to local norms*]

To what degree were you careful in the last week to avoid interaction with people outside your household? [1 – not careful at all … 7 – as careful as possible]

In your daily life, how important is it that you take actions that protect yourself and others from COVID-19? [1 – not at all important … 7 – extremely important]

Compared to before the pandemic, I have changed many aspects of my everyday behavior to protect myself and others from COVID-19 [1 – strongly disagree … 7 – strongly agree]

Religious precautions:

How often do you engage in… [1 – never … 7 – very frequently]

3. Individual religious behavior such as prayer (for example praying alone) to protect yourself and others from COVID-19
4. Collective religious behavior such as attending a church/synagogue/mosque/temple/shrine to protect yourself and others from COVID-19

Conventionalism: From the Aggression-Submission-Conventionalism scale(Dunwoody & Funke, 2016), a measure of right-wing authoritarianism.

The following questions concern values that people may or may not hold. Please select a number to indicate the degree to which you agree or disagree with each statement. [1 – strongly disagree … 7 – strongly agree]

11. People emphasize tradition too much. (r)
12. It would be better for society if more people followed social norms.
13. People should respect social norms.
14. Traditions are the foundation of a healthy society and should be respected.
15. Traditions interfere with progress. (r)
16. People should challenge social traditions in order to advance society. (r)

Moral Foundations authority subscale: Short-form measure(Graham et al., 2008).

When you decide whether something is right or wrong, to what extent are the following considerations relevant to your thinking? Please rate each statement using this scale: [1 – not at all relevant … 7 – extremely relevant]

3. Whether or not someone showed a lack of respect for authority
4. Whether or not someone conformed to the traditions of society

Please read the following sentences and indicate your agreement or disagreement [1 – strongly disagree … 7 – strongly agree]

3. Men and women each have different roles to play in society.
4. Respect for authority is something all children need to learn.

Traditionalism Factor: Items derived from Conventionalism and Moral Foundations authority subscales.

1. It would be better for society if more people followed social norms (see anchors above).
2. People should respect social norms (see anchors above).
3. Traditions are the foundation of a healthy society and should be respected. (see anchors above).
4. Whether or not someone showed a lack of respect for authority (see anchors above).
5. Whether or not someone conformed to the traditions of society (see anchors above).
6. Respect for authority is something all children need to learn (see anchors above).

Other items:

7. Distrust in scientists:

    How much do you think scientists provide advice based on accurate information

    about what to do during the COVID-19 outbreak? [1 – not at all accurate … 7 –

    extremely accurate]

8. Belief in a deity/deities/higher power(s):

    Do you believe in God or another deity or deities?

    - Yes
    - No
    - Prefer not to answer

COVID-19-relevant covariates:

5. Perceived COVID-19 prevalence:

    In your opinion, how prevalent is COVID-19 in your local community? [1

    – not at all prevalent … 7 – extremely prevalent]

6. Population density:

How would you best describe the area where you live?

- Large city
- Small city
- Town or suburb
- Village or countryside

7. Job requirements:

If applicable, does your job currently require that you leave the home?

- Always required to leave the home
- Sometimes required to leave the home
- Rarely required to leave the home
- Never required to leave the home
- I don't have a job

8. Health conditions:

Has a doctor or other health professional ever diagnosed you with any of the

following health conditions?

- Autoimmune disease
- Weak immune system
- Diabetes
- High blood pressure
- Heart disease
- Asthma
- Kidney disease

Demographic variables and attention checks:

5. Gender (some response options differed across study sites, see OSF repository for details):

What is your gender identity?

- Woman
- Man
- Other

6. Education (Response options differed across study sites based on local education systems. For the purposes of analysis, those response options were binned into the following four categories. see OSF repository for details):

Your highest level of education completed?

- Primary school
- Secondary school
- Undergraduate level
- Advanced/post-graduate level

7. Age:

What is your age in years?

8. Relative wealth:

Compared to other people in your country, how would you describe your wealth? [1 – much less wealthy than most other people in my country ... 7 – much wealthier than most other people in my country]

7. Attention check 1:

When you look up on a clear day, what color is the sky?

- Train station
- Laptop
- Blue
- Cardboard box
- Chicken
- Green
- Book
- Lamp

8. Attention check 2:

Did you carefully consider your responses to this survey (please be honest)?

- Yes
- No

5. Differences between pre-registration and final manuscript

There are several differences between the pre-registered measures and those reported in the main text and supplement. Here, we explain those differences.

- *Unincluded study sites*: In addition to the 27 countries included in the manuscript, we pre-registered that we would collect data in the following additional countries: Russia, Brazil, Colombia, Egypt, and Armenia. However, these countries were not included in the final sample for a variety of unanticipated circumstances. In Armenia, Brazil, and Russia, data collection never began due to extenuating circumstances. In Egypt and Colombia, data collection began, but we were unable to recruit more than 60 participants in either country after exclusion criteria were applied. Therefore, they were excluded from the study, and the existing underpowered data was never analyzed in any way. We specified in the pre-registration that study sites may be excluded on the basis of insufficient participant recruitment.
- *COVID-19 infection status:* Participants were asked whether they were currently known to be infected with COVID-19. We intended to use this as a covariate with the other COVID-19-related covariates in relevant meta-analyses. However, at some study sites, no participants reported being infected with COVID-19. Therefore, it was dropped from analysis.

6. Analysis software

We used R(R Core Team, 2020), RStudio (RStudio Team, 2019), and the R-packages ggpubr (Kassambara, 2023), gridExtra (Auguie, 2017), interactions (Long, 2019), lme4 (Bates et al., 2015, p. 4), lmerTest (Kuznetsova et al., 2017), metadat (White et al., 2022), metafor (Viechtbauer, 2010), psych (Revelle, 2019), report (Makowski et al., 2021), scales (Wickham & Seidel, 2020), and tidyverse (Wickham et al., 2019) for our analyses. The code that produced all analyses in the main text and supplement is openly available at: https://osf.io/6vu5b/?view_only=873259d429c346d2912303fc44df5079.

7. Software version and source information

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65.  haven          2.5.1      2022-08-22 [1] CRAN (R 4.2.2)
66.  hms            1.1.2      2022-08-19 [1] CRAN (R 4.2.2)
67.  htmltools      0.5.4      2022-12-07 [1] CRAN (R 4.2.2)
68.  httr           1.4.4      2022-08-17 [1] CRAN (R 4.2.2)
69.  insight        0.19.0     2023-01-30 [1] CRAN (R 4.2.2)
70.  interactions * 1.1.5      2021-07-02 [1] CRAN (R 4.2.2)
71.  jsonlite       1.8.4      2022-12-06 [1] CRAN (R 4.2.2)
72.  jtools         2.2.1      2022-12-02 [1] CRAN (R 4.2.2)
73.  knitr          1.42       2023-01-25 [1] CRAN (R 4.2.2)
74.  lattice        0.20-45    2021-09-22 [2] CRAN (R 4.2.2)
75.  lifecycle      1.0.3      2022-10-07 [1] CRAN (R 4.2.2)
76.  lme4         * 1.1-31     2022-11-01 [1] CRAN (R 4.2.2)
77.  lmerTest     * 3.1-3      2020-10-23 [1] CRAN (R 4.2.2)
78.  lubridate      1.9.2      2023-02-10 [1] CRAN (R 4.2.2)
79.  magrittr       2.0.3      2022-03-30 [1] CRAN (R 4.2.2)
80.  MASS           7.3-58.1   2022-08-03 [2] CRAN (R 4.2.2)
81.  mathjaxr       1.6-0      2022-02-28 [1] CRAN (R 4.2.2)
82.  Matrix       * 1.5-1      2022-09-13 [2] CRAN (R 4.2.2)
83.  metadat      * 1.2-0      2022-04-06 [1] CRAN (R 4.2.2)
84.  metafor      * 3.8-1      2022-08-26 [1] CRAN (R 4.2.2)
85.  minqa          1.2.5      2022-10-19 [1] CRAN (R 4.2.2)
86.  mnormt         2.1.1      2022-09-26 [1] CRAN (R 4.2.1)
87.  modelr         0.1.10     2022-11-11 [1] CRAN (R 4.2.2)
88.  multcomp       1.4-22     2023-02-10 [1] CRAN (R 4.2.2)
89.  munsell        0.5.0      2018-06-12 [1] CRAN (R 4.2.2)
90.  mvtnorm        1.1-3      2021-10-08 [1] CRAN (R 4.2.0)
91.  nlme           3.1-160    2022-10-10 [2] CRAN (R 4.2.2)
92.  nloptr         2.0.3      2022-05-26 [1] CRAN (R 4.2.2)
93.  numDeriv       2016.8-1.1 2019-06-06 [1] CRAN (R 4.2.0)
94.  pander         0.6.5      2022-03-18 [1] CRAN (R 4.2.2)
95.  parameters     0.20.2     2023-01-27 [1] CRAN (R 4.2.2)
96.  performance    0.10.2     2023-01-12 [1] CRAN (R 4.2.2)
97.  pillar         1.8.1      2022-08-19 [1] CRAN (R 4.2.2)
98.  pkgconfig      2.0.3      2019-09-22 [1] CRAN (R 4.2.2)
99.  psych        * 2.2.9      2022-09-29 [1] CRAN (R 4.2.2)
100. purrr        * 1.0.1      2023-01-10 [1] CRAN (R 4.2.2)
101. R6             2.5.1      2021-08-19 [1] CRAN (R 4.2.2)
102. Rcpp           1.0.10     2023-01-22 [1] CRAN (R 4.2.2)
```

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103. readr       * 2.1.4    2023-02-10 [1] CRAN (R 4.2.2)
104. readxl        1.4.2    2023-02-09 [1] CRAN (R 4.2.2)
105. report      * 0.5.6    2023-02-05 [1] CRAN (R 4.2.2)
106. reprex        2.0.2    2022-08-17 [1] CRAN (R 4.2.2)
107. rlang         1.0.6    2022-09-24 [1] CRAN (R 4.2.2)
108. rmarkdown     2.20     2023-01-19 [1] CRAN (R 4.2.2)
109. rstatix       0.7.2    2023-02-01 [1] CRAN (R 4.2.2)
110. rstudioapi    0.14     2022-08-22 [1] CRAN (R 4.2.2)
111. rvest         1.0.3    2022-08-19 [1] CRAN (R 4.2.2)
112. sandwich      3.0-2    2022-06-15 [1] CRAN (R 4.2.2)
113. scales      * 1.2.1    2022-08-20 [1] CRAN (R 4.2.2)
114. sessioninfo * 1.2.2    2021-12-06 [1] CRAN (R 4.2.2)
115. stringi       1.7.12   2023-01-11 [1] CRAN (R 4.2.2)
116. stringr     * 1.5.0    2022-12-02 [1] CRAN (R 4.2.2)
117. survival      3.4-0    2022-08-09 [2] CRAN (R 4.2.2)
118. TH.data       1.1-1    2022-04-26 [1] CRAN (R 4.2.2)
119. tibble      * 3.1.8    2022-07-22 [1] CRAN (R 4.2.2)
120. tidyr       * 1.3.0    2023-01-24 [1] CRAN (R 4.2.2)
121. tidyselect    1.2.0    2022-10-10 [1] CRAN (R 4.2.2)
122. tidyverse   * 1.3.2    2022-07-18 [1] CRAN (R 4.2.2)
123. timechange    0.2.0    2023-01-11 [1] CRAN (R 4.2.2)
124. tzdb          0.3.0    2022-03-28 [1] CRAN (R 4.2.2)
125. utf8          1.2.3    2023-01-31 [1] CRAN (R 4.2.2)
126. vctrs         0.5.2    2023-01-23 [1] CRAN (R 4.2.2)
127. vroom         1.6.1    2023-01-22 [1] CRAN (R 4.2.2)
128. withr         2.5.0    2022-03-03 [1] CRAN (R 4.2.2)
129. xfun          0.37     2023-01-31 [1] CRAN (R 4.2.2)
130. xml2          1.3.3    2021-11-30 [1] CRAN (R 4.2.2)
131. xtable        1.8-4    2019-04-21 [1] CRAN (R 4.2.2)
132. yaml          2.3.7    2023-01-23 [1] CRAN (R 4.2.2)
133. zoo           1.8-11   2022-09-17 [1] CRAN (R 4.2.2)
```

Map of Study Sites

Figure A3.1. Map of countries (purple pins) that were included in the study. See a list of study sites in Table A3.3. This map was created by the authors using www.mapcustomizer.com.

Summary statistics and other information by study site

Table A3.1, below, presents a list of study sites, study-site specific Ns, as well as information on survey languages, recruitment procedures, and participant demographics for each study site. In the main text we report excluding participants on the basis of minimum completeness and correct answers to attention checks. Across all the study sites, 11,983 participants at least started the survey. We excluded 4,139 participants based on the above criteria, to arrive at a final sample size of 7,844. This relatively high attrition rate is unsurprising given that, at a majority of study sites, participants were uncompensated volunteers.

Study Site	Survey Language	Population	Recruitment Method	Compensation	N	Mean (SD) Age	% Women	Mean (SD) Religious Precautions Composite	Mean (SD) COVID-19 Public Health Precautions Composite	Average daily confirmed COVID-19 cases per million people over data collection period
Austria	German	Students; general population	Social media; classrooms	Volunteer	244	34.69 (13.28)	84	1.50 (1.12)	4.38 (1.04)	205.84
Canada	English	Students	Subject pools	Course credit	221	19.34 (2.40)	77	2.08 (1.44)	5.25 (.96)	109.18
Chile	Spanish	Students; general population	Social media; classrooms	Volunteer	195	31.91 (12.71)	67	1.85 (1.39)	5.61 (.83)	359.77
China	Mandarin Chinese	General population	Online workers (Weidiaocha)	CNY ¥6	317	25.27 (6.21)	55	2.64 (1.47)	5.78 (.81)	.02
Denmark	Danish	General population	Online workers (YouGov)	75 YouGov points	307	50.11 (18.23)	50	2.62 (1.32)	5.07 (.97)	233.77
France	French	Students; general population	Social media; classrooms	Volunteer	176	29.80 (13.29)	66	1.21 (.75)	3.88 (.99)	52.18
Guatemala	Spanish	General population	Social media	Volunteer	457	39.65 (12.67)	80	3.21 (1.80)	5.36 (1.03)	41.00
India	English	Students	Classrooms	Volunteer	118	28.33 (9.01)	62	4.33 (1.87)	5.33 (1.06)	8.60

Study Site	Survey Language	Population	Recruitment Method	Compensation	N	Mean (SD) Age	% Women	Mean (SD) Religious Precautions Composite	Mean (SD) COVID-19 Public Health Precautions Composite	Average daily confirmed COVID-19 cases per million people over data collection period
Indonesia	Indonesian	Students; general population	Classrooms; social media	Volunteer	257	31.10 (9.97)	76	3.87 (1.37)	5.57 (.82)	32.02
Israel	Hebrew	Students	Subject pools	Course credit	267	22.49 (2.44)	51	1.83 (1.41)	4.37 (1.01)	609.52
Italy	Italian	General population	Social media	Volunteer	135	35.31 (15.50)	61	1.91 (1.52)	4.99 (1.02)	235.94
Japan	Japanese	Students	Subject pools; classrooms	Course credit or volunteer	231	22.36 (4.36)	46	1.22 (.72)	4.81 (.98)	19.40
Kenya	English	Students; general population	Classrooms; snowball recruitment	Course credit or volunteer	133	23.60 (4.91)	50	4.70 (.1.56)	5.22 (1.12)	8.60
South Korea	Korean	Students	Subject pools; classrooms	Course credit or volunteer	167	23.25 (3.92)	63	1.64 (1.32)	4.86 (.87)	11.05
Lithuania	Lithuanian	Students; general population	Social media; classrooms	Volunteer	211	28.03 (10.33)	80	1.64 (1.23)	4.05 (.92)	213.78
Mexico	Spanish	Students; general population	Social media; classrooms	Volunteer	153	28.75 (10.97)	65	2.04 (1.51)	5.51 (1.00)	29.02
Netherlands	Dutch	General population	Online workers (Prolific Academic)	€ 1.10	300	29.58 (10.22)	41	1.36 (.99)	4.63 (.92)	340.18
Philippines	English	Students; general population	Social media	Volunteer	229	21.17 (3.64)	75	5.00 (1.68)	5.76 (.92)	67.20
Poland	Polish	Students; general population	Social media; classrooms	Volunteer	1,665	22.98 (7.54)	74	2.22 (1.73)	4.35 (1.15)	240.09
Portugal	Portuguese	General population	Subject pools	Raffle (5 prizes worth € 10.00)	264	27.58 (8.82)	76	1.77 (1.41)	5.18 (.85)	53.41

Qatar	Arabic	Students; general population	Social media; classrooms	Volunteer	146	24.23 (6.84)	82	4.23 (1.41)	5.08 (1.08)	279.66
Singapore	English	Students	Subject pools	Course credit	155	21.58 (2.03)	78	2.61 (1.67)	4.31 (.87)	2.77
Slovakia	Slovak	Students	classrooms	Volunteer	222	21.90 (3.89)	77	2.35 (1.75)	4.63 (.96)	389.92
Spain	Spanish	General population	Social media	Volunteer	365	40.15 (13.74)	79	1.60 (1.29)	4.94 (1.32)	562.56
Turkey	Turkish	Students; general population	Social media; classrooms	Volunteer	352	31.71 (16.28)	77	2.29 (1.35)	5.72 (.84)	287.61
U.K.	English	General population	Online workers (Prolific Academic)	£0.82	316	36.81 (13.87)	70	1.42 (1.10)	5.15 (.99)	340.47
U.S.	English	General population	Social media	Volunteer	241	33.08 (18.91)	83	1.99 (1.42)	4.98 (.98)	305.59
Pooled Sample	-	-	-	-	7,844	28.91 (12.95)	70	2.32 (1.72)	4.94 (1.16)	186.64

Table A3.1. Summary statistics and other information by study site

country	relative wealth M	relative wealth SD	COVID prevalence M	COVID prevalence SD	education - primary	education - secondary	education - undergraduate	education - advanced	has health condition	does not have health condition	density - village or countryside	density - town or suburb	density - small city	density - large city
austria	4.06	1.05	2.79	1.40	0.04	0.66	0.27	0.02	0.23	0.77	0.20	0.57	0.09	0.13
canada	4.48	1.04	4.90	1.44	0.00	0.90	0.10	0.00	0.22	0.78	0.05	0.32	0.39	0.24
chile	4.08	1.28	5.14	1.53	0.22	0.23	0.37	0.18	0.88	0.12	0.03	0.10	0.22	0.65
china	3.38	1.18	2.44	1.59	0.00	0.05	0.44	0.50	0.20	0.80	0.09	0.11	0.38	0.41
denmark	4.77	1.44	5.13	1.41	0.07	0.42	0.50	0.01	0.29	0.71	0.21	0.29	0.21	0.28
france	4.02	1.04	3.43	1.34	0.01	0.05	0.45	0.48	0.24	0.76	0.25	0.05	0.21	0.49
guatemala	4.13	1.54	5.16	1.59	0.01	0.08	0.55	0.36	0.31	0.69	0.04	0.20	0.19	0.58
india	3.78	1.61	3.80	1.60	0.00	0.00	0.19	0.81	0.49	0.51	0.18	0.18	0.25	0.39
indonesia	3.26	1.03	5.11	1.44	0.00	0.24	0.49	0.27	0.31	0.69	0.03	0.13	0.09	0.75
israel	4.56	1.11	3.62	1.35	0.01	0.91	0.08	0.00	0.22	0.78	0.14	0.04	0.22	0.60
italy	3.57	1.20	4.64	1.34	0.01	0.35	0.56	0.07	0.24	0.76	0.08	0.24	0.21	0.46
japan	4.62	1.16	3.02	1.73	0.00	0.45	0.35	0.17	0.14	0.86	0.03	0.15	0.27	0.55
kenya	2.71	1.40	3.52	1.71	0.01	0.42	0.52	0.04	0.28	0.72	0.15	0.36	0.08	0.41
korea	3.57	1.13	4.69	1.32	0.00	0.87	0.10	0.02	0.13	0.87	0.00	0.02	0.10	0.88
lithuania	3.82	1.19	3.90	1.36	0.00	0.51	0.21	0.28	0.25	0.75	0.05	0.08	0.13	0.74
mexico	3.44	1.19	4.81	1.40	0.00	0.39	0.44	0.15	0.22	0.78	0.01	0.24	0.44	0.31
netherlands	3.90	1.26	3.93	1.42	0.01	0.29	0.44	0.26	0.16	0.84	0.25	0.09	0.28	0.37
philippines	2.93	1.28	4.29	1.76	0.01	0.56	0.30	0.01	0.34	0.66	0.18	0.48	0.28	0.06
poland	3.67	1.04	4.28	1.52	0.00	0.72	0.17	0.10	0.32	0.68	0.24	0.17	0.51	0.07
portugal	3.69	1.29	4.27	1.51	0.00	0.21	0.38	0.40	0.28	0.72	0.07	0.19	0.23	0.51
qatar	3.86	1.24	5.55	1.37	0.00	0.61	0.33	0.01	0.35	0.65	0.01	0.03	0.48	0.48
singapore	4.22	0.97	3.10	1.43	0.00	0.80	0.20	0.00	0.13	0.87	0.00	0.10	0.65	0.25
slovakia	3.76	1.16	4.27	1.63	0.00	0.77	0.19	0.04	0.98	0.02	0.36	0.03	0.29	0.32
spain	2.92	1.13	5.10	1.70	0.01	0.41	0.42	0.13	0.38	0.62	0.07	0.31	0.44	0.17
turkey	3.91	1.26	4.72	1.43	0.00	0.47	0.34	0.19	0.48	0.52	0.06	0.03	0.18	0.73
uk	3.53	1.17	3.92	1.37	0.01	0.41	0.41	0.16	0.25	0.75	0.17	0.45	0.16	0.22
us	4.51	1.22	4.05	1.51	0.00	0.51	0.33	0.16	0.30	0.70	0.00	0.36	0.23	0.41

Table A3.2 Demographic and COVID-19 related covariates. Table displaying summary statistics for a variety of demographic and COVID-19 related covariates. Relative wealth was measured on a 1-7 Likert scale, with participants asked to indicate their perceived relative wealth compared to other people living in the participant's country, from much less wealthy to much more wealthy. Perceived COVID-19 prevalence was measured on a 1-7 Likert scale from not at all prevalent to extremely prevalent.

The additional covariates, such as education, presented in Table S2 were categorical. In the table, proportions are then given for each level of these categorical variables. The education variable asked participants their highest level of completed education, grouped into four categories: primary level, secondary level, undergraduate level, and post-graduate level. For the health conditions item, participants were presented with a list of various health conditions (such as diabetes and heart disease), and asked for each condition whether they had been diagnosed with that condition. Participants were then grouped into whether they had not been diagnosed with any of the health conditions, or if they had been diagnosed with at least one of the conditions. Finally, the population density question asked participants to describe the density of the population area in which they lived, from village or countryside to large city. Note that proportions have been rounded to the nearest hundredth.

Analyses Supporting Main Text

12. Testing epistemic conflict - belief in higher powers and trust in scientists

Although perceptions of an epistemic conflict between religion and science vis a vis the COVID-19 pandemic were not directly measured, we sought to gauge those attitudes obliquely using available questions. Concordantly, in the main text, we stated that participants who reported belief in a deity, deities, or higher power(s) were less trusting in scientists regarding the pandemic. Here, we report the results of a *T*-test demonstrating said difference. The 3,449 participants who believed in a higher power (*M* = 5.14, SD = 1.46) compared to the 3,003 participants who did not believe in a higher power (*M* = 5.58, SD = 1.32) were significantly less trusting in scientists regarding the COVID-19 pandemic, t(6443.9) = -12.73, p < 22.2e-16.

13. Traditionalism-precautions relationship using factor scores

In the main text analyses, we used composite variables for traditionalism and COVID-19 public health precautions (including its two subscales, internal- and external-facing precautions) that were comprised of raw averages of all the items that loaded onto each respective factor in exploratory factor analyses (see Samore et al., 2023 for details). However, in the main text, we report that using factor scores instead of raw averages in the main text analyses did not conceptually affect the results. Here, we present those results. First, after extracting factor scores for the relevant composite variables described above, we found that said factor scores were highly correlated with their corresponding composited averages (Samore et al., 2023).

Second, we then re-analyzed the main text results using the factor scores instead of the composited averages. The relationship between religious precautions and public health precautions did not conceptually change as a result of using the factor scores, see Figure A3.2. Further, the interaction between collective versus individual religious precautions, and internal- versus external-facing public health precautions, also did not conceptually change (see Figure A3.3). Likewise, the use of factor scores did not conceptually affect the correlation between religious precautions and traditionalism (see Figure A3.4). Finally, the relative strength of association between traditionalism on the one hand, and public health versus religious precautions on the other, also did not conceptually change as a result of using factor scores. There was an interaction between precautions mode and traditionalism (*B* = .30, *SE* = .02, *t*(7536) = 17.64). A simple slopes analysis revealed that the correlation between traditionalism and religious precautions (*B* = .51, SE = .01, *t*(7,536) = 39.15) was about twice as strong as the correlation between traditionalism and external-facing public health precautions (*B* = .21, SE = .01, *t*(7,536) = 15.47). Compare to the interaction plotted in Figure 4 in the main text.

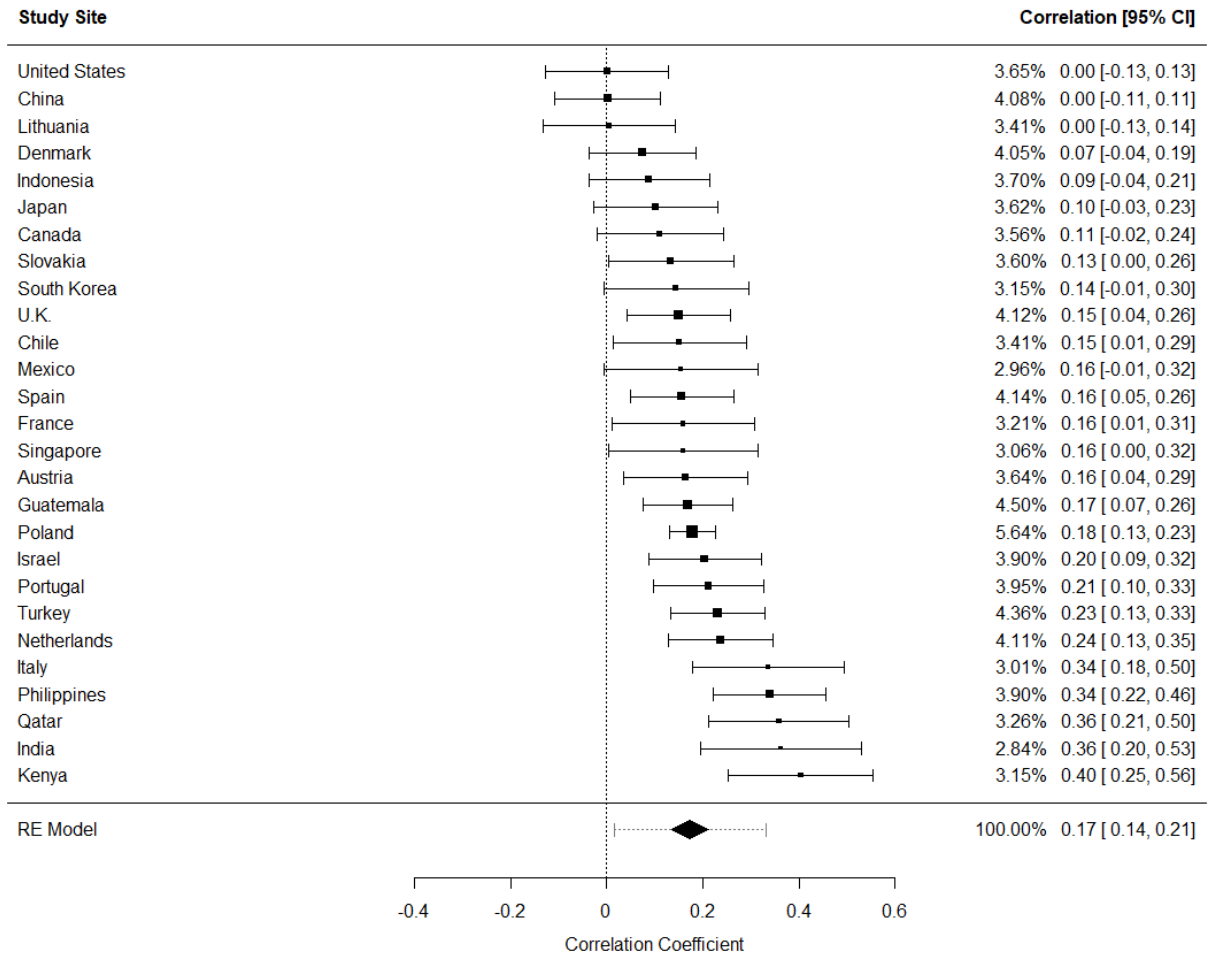| Study Site		Correlation [95% CI]
United States		3.65% 0.00 [-0.13, 0.13]
China		4.08% 0.00 [-0.11, 0.11]
Lithuania		3.41% 0.00 [-0.13, 0.14]
Denmark		4.05% 0.07 [-0.04, 0.19]
Indonesia		3.70% 0.09 [-0.04, 0.21]
Japan		3.62% 0.10 [-0.03, 0.23]
Canada		3.56% 0.11 [-0.02, 0.24]
Slovakia		3.60% 0.13 [0.00, 0.26]
South Korea		3.15% 0.14 [-0.01, 0.30]
U.K.		4.12% 0.15 [0.04, 0.26]
Chile		3.41% 0.15 [0.01, 0.29]
Mexico		2.96% 0.16 [-0.01, 0.32]
Spain		4.14% 0.16 [0.05, 0.26]
France		3.21% 0.16 [0.01, 0.31]
Singapore		3.06% 0.16 [0.00, 0.32]
Austria		3.64% 0.16 [0.04, 0.29]
Guatemala		4.50% 0.17 [0.07, 0.26]
Poland		5.64% 0.18 [0.13, 0.23]
Israel		3.90% 0.20 [0.09, 0.32]
Portugal		3.95% 0.21 [0.10, 0.33]
Turkey		4.36% 0.23 [0.13, 0.33]
Netherlands		4.11% 0.24 [0.13, 0.35]
Italy		3.01% 0.34 [0.18, 0.50]
Philippines		3.90% 0.34 [0.22, 0.46]
Qatar		3.26% 0.36 [0.21, 0.50]
India		2.84% 0.36 [0.20, 0.53]
Kenya		3.15% 0.40 [0.25, 0.56]
RE Model		100.00% 0.17 [0.14, 0.21]

Figure A3.2. Results of random-effects meta-analysis examining the zero-order correlation between the COVID-19 public health precautions factor scores and the COVID-19 religious precautions composite. Compare to Figure 1 in the main text.

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Figure A3.3. Effect of individual versus collective and internal- versus external-facing precautions on the relationship between religious and public health precautions. Results of two linear mixed models, simultaneously regressing internal- and external-facing public health precautions on individual and collective religious precautions respectively, using factor scores instead of averaged composites. Lines indicate 95% confidence intervals. Compare to Figure 2 in main text.

Figure A3.4. Results of random-effects meta-analysis examining the zero-order correlation between the traditionalism factor scores and the COVID-19 religious precautions composite. Compare to Figure 3 in the main text.

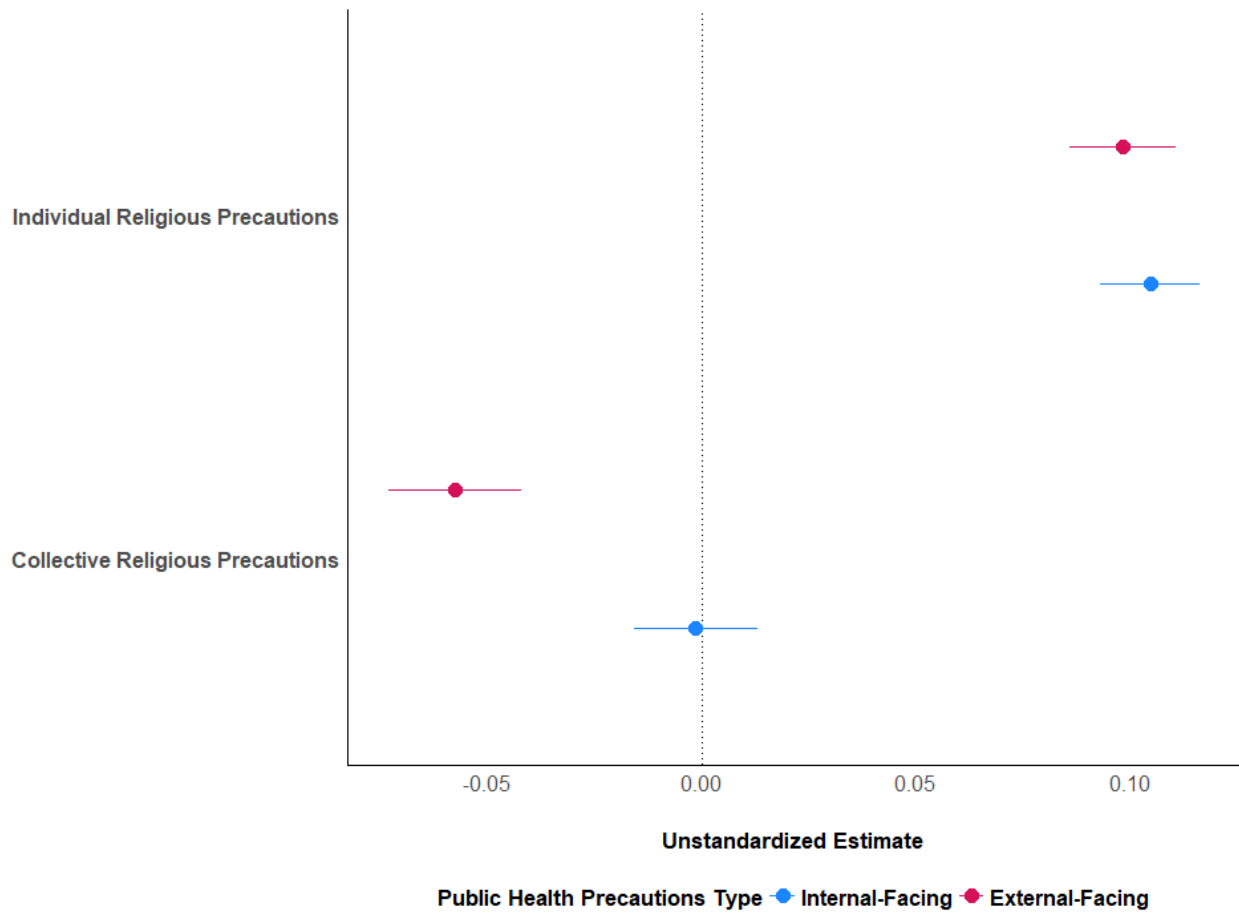## 14. Traditionalism and individual versus collective religious precautions

In the main text, we claimed that the correlation between traditionalism and COVID-19 religious precautions was conceptually unaffected by combining individual and collective religious precautions into a combined composite, versus analyzing individual and collective religious precautions separately. Here (see figures A3.5 and A3.6), we show the analyses using the separated religious precautions.

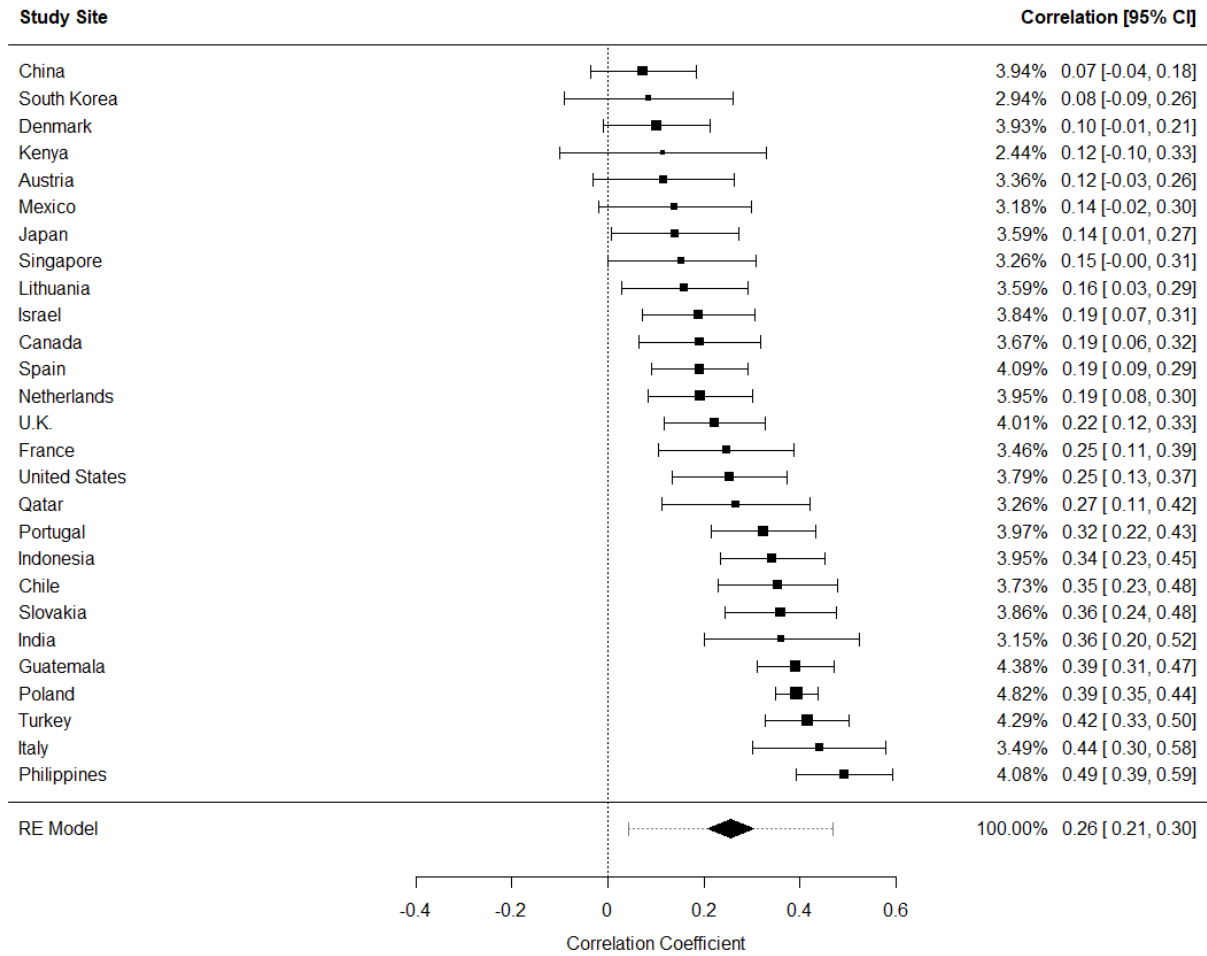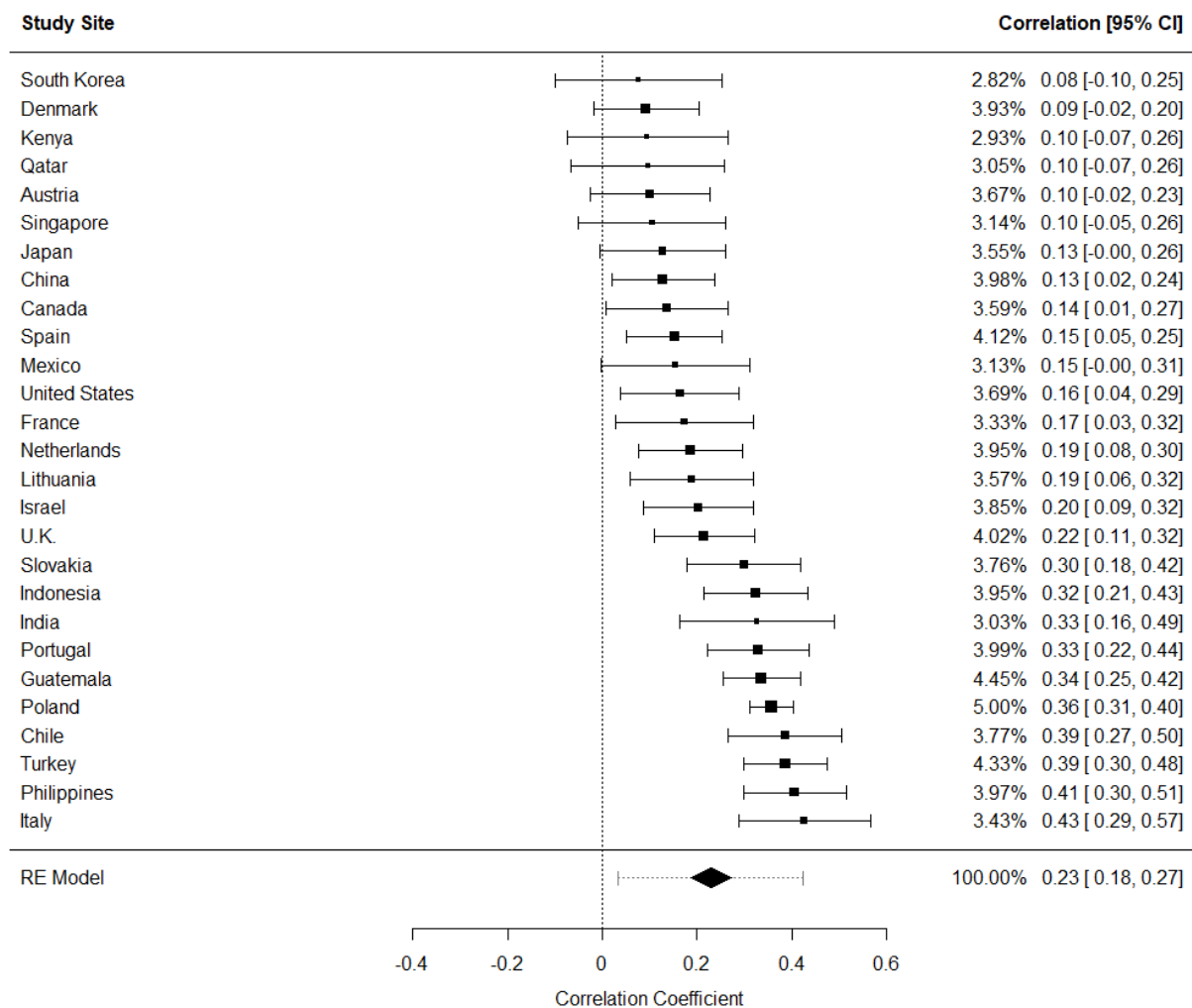**Figure A3.5.** Results of random-effects meta-analysis examining the zero-order correlation between the traditionalism composite and COVID-19 individual religious precautions only. Compare to Figure 3 in the main text.

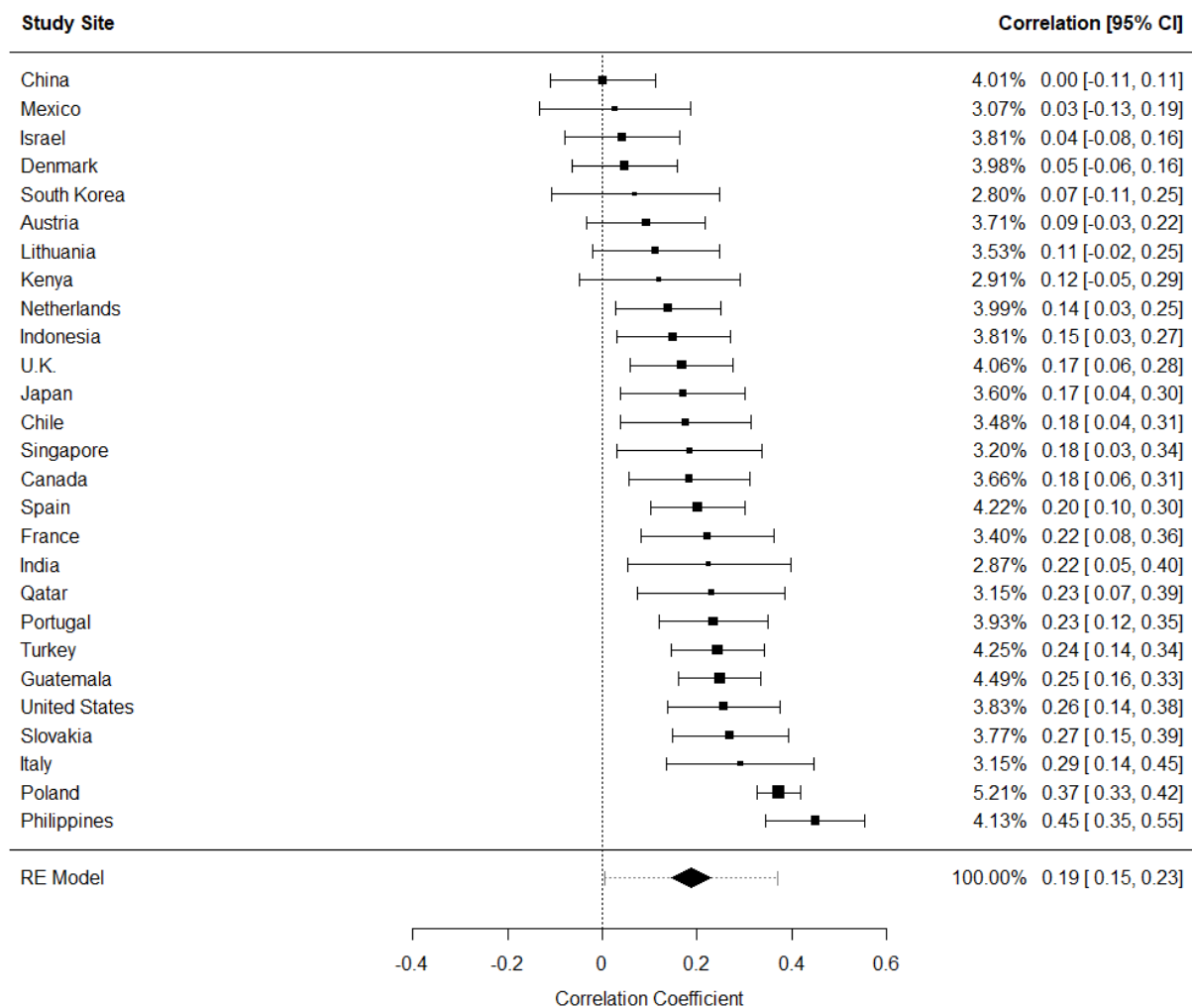| Study Site		Correlation [95% CI]
China		4.01% 0.00 [-0.11, 0.11]
Mexico		3.07% 0.03 [-0.13, 0.19]
Israel		3.81% 0.04 [-0.08, 0.16]
Denmark		3.98% 0.05 [-0.06, 0.16]
South Korea		2.80% 0.07 [-0.11, 0.25]
Austria		3.71% 0.09 [-0.03, 0.22]
Lithuania		3.53% 0.11 [-0.02, 0.25]
Kenya		2.91% 0.12 [-0.05, 0.29]
Netherlands		3.99% 0.14 [0.03, 0.25]
Indonesia		3.81% 0.15 [0.03, 0.27]
U.K.		4.06% 0.17 [0.06, 0.28]
Japan		3.60% 0.17 [0.04, 0.30]
Chile		3.48% 0.18 [0.04, 0.31]
Singapore		3.20% 0.18 [0.03, 0.34]
Canada		3.66% 0.18 [0.06, 0.31]
Spain		4.22% 0.20 [0.10, 0.30]
France		3.40% 0.22 [0.08, 0.36]
India		2.87% 0.22 [0.05, 0.40]
Qatar		3.15% 0.23 [0.07, 0.39]
Portugal		3.93% 0.23 [0.12, 0.35]
Turkey		4.25% 0.24 [0.14, 0.34]
Guatemala		4.49% 0.25 [0.16, 0.33]
United States		3.83% 0.26 [0.14, 0.38]
Slovakia		3.77% 0.27 [0.15, 0.39]
Italy		3.15% 0.29 [0.14, 0.45]
Poland		5.21% 0.37 [0.33, 0.42]
Philippines		4.13% 0.45 [0.35, 0.55]
RE Model		100.00% 0.19 [0.15, 0.23]

Figure A3.6. Results of random-effects meta-analysis examining the zero-order correlation between the traditionalism composite and COVID-19 collective religious precautions only. Compare to Figure 3 in the main text.

15. Accounting for covariates

In the main text, we reported that results were not conceptually affected by the inclusion of additional covariates, including demographic controls and COVID-19 related variables. Here, we show those analyses. For all models presented below, the following covariates were added: age; gender; education; relative income; perceived COVID-19 prevalence in participants' local communities; the population density of those communities; whether participants' jobs required that they leave the home; and whether participants had certain pre-existing medical conditions that put them at higher risk for severe disease.

First, we conducted a random-effects, restricted maximum likelihood meta-analysis in which each study was treated as a separate sample. We tested the semi-partial correlation between public health and religious precautions after adjusting for the effects of the eight aforementioned covariates in multiple linear regressions. As seen in Figure A3.7, adjusting for these covariates did not conceptually change the results. We used the same procedure to test the covariate-adjusted relationship between religious precautions and traditionalism, which were similarly conceptually unaffected (see Figure A3.8).

Second, we also conducted the interaction analyses from the main text while adjusting for the eight covariates. Accounting for these variables did not conceptually affect the interaction between collective versus individual religious precautions and internal- versus external-facing public health precautions (Figure A3.9) nor the interaction between precautions mode (public health or religious) and traditionalism (Table A3.3).
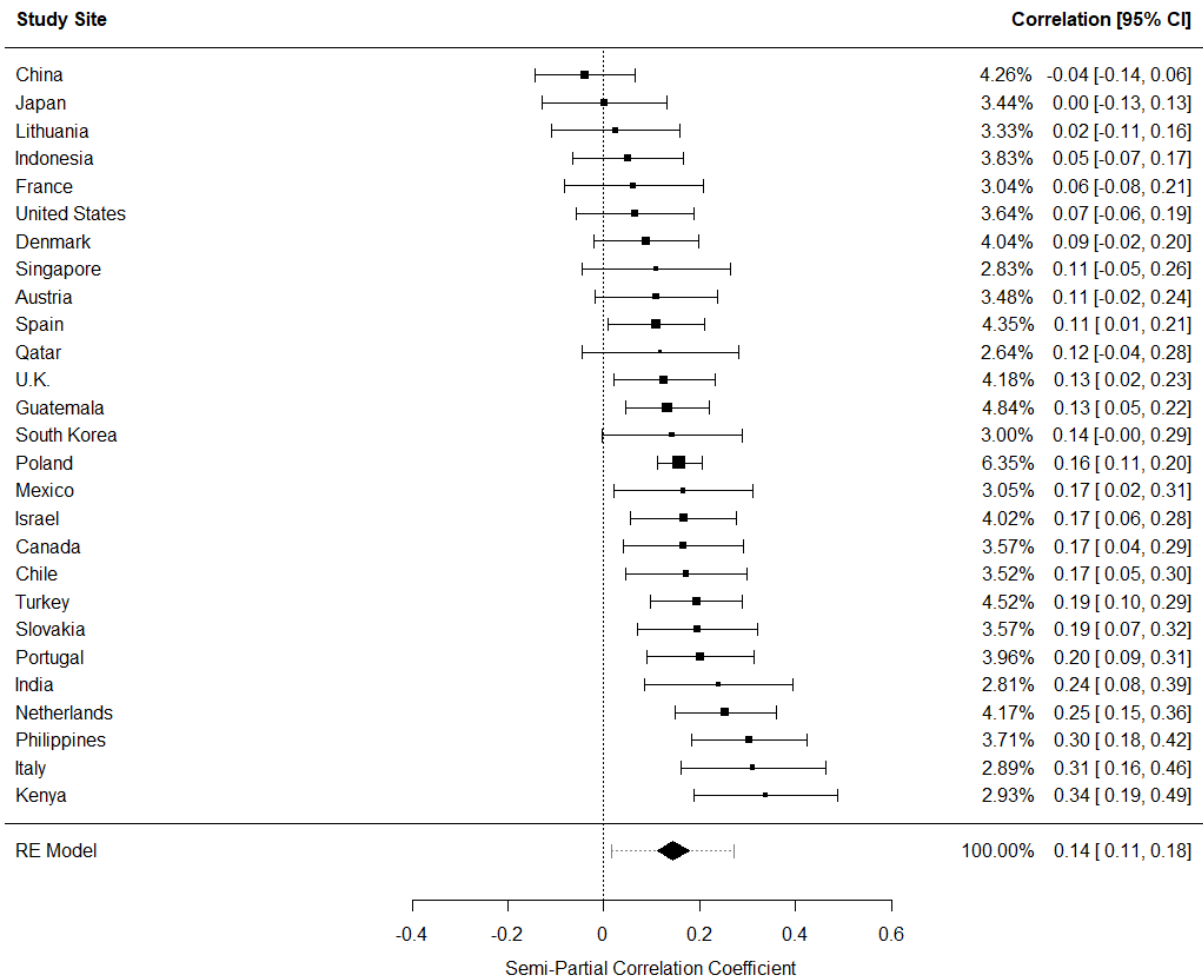
Study Site	Correlation [95% CI]

Study Site		
China	4.26%	-0.04 [-0.14, 0.06]
Japan	3.44%	0.00 [-0.13, 0.13]
Lithuania	3.33%	0.02 [-0.11, 0.16]
Indonesia	3.83%	0.05 [-0.07, 0.17]
France	3.04%	0.06 [-0.08, 0.21]
United States	3.64%	0.07 [-0.06, 0.19]
Denmark	4.04%	0.09 [-0.02, 0.20]
Singapore	2.83%	0.11 [-0.05, 0.26]
Austria	3.48%	0.11 [-0.02, 0.24]
Spain	4.35%	0.11 [0.01, 0.21]
Qatar	2.64%	0.12 [-0.04, 0.28]
U.K.	4.18%	0.13 [0.02, 0.23]
Guatemala	4.84%	0.13 [0.05, 0.22]
South Korea	3.00%	0.14 [-0.00, 0.29]
Poland	6.35%	0.16 [0.11, 0.20]
Mexico	3.05%	0.17 [0.02, 0.31]
Israel	4.02%	0.17 [0.06, 0.28]
Canada	3.57%	0.17 [0.04, 0.29]
Chile	3.52%	0.17 [0.05, 0.30]
Turkey	4.52%	0.19 [0.10, 0.29]
Slovakia	3.57%	0.19 [0.07, 0.32]
Portugal	3.96%	0.20 [0.09, 0.31]
India	2.81%	0.24 [0.08, 0.39]
Netherlands	4.17%	0.25 [0.15, 0.36]
Philippines	3.71%	0.30 [0.18, 0.42]
Italy	2.89%	0.31 [0.16, 0.46]
Kenya	2.93%	0.34 [0.19, 0.49]
RE Model	100.00%	0.14 [0.11, 0.18]

Figure A3.7. Results of random-effects meta-analysis examining the semi-partial correlation between the COVID-19 public health precautions composite and the COVID-19 religious precautions composite after adjusting for the eight demographic and COVID-related covariates. Compare to Figure 1 in the main text.
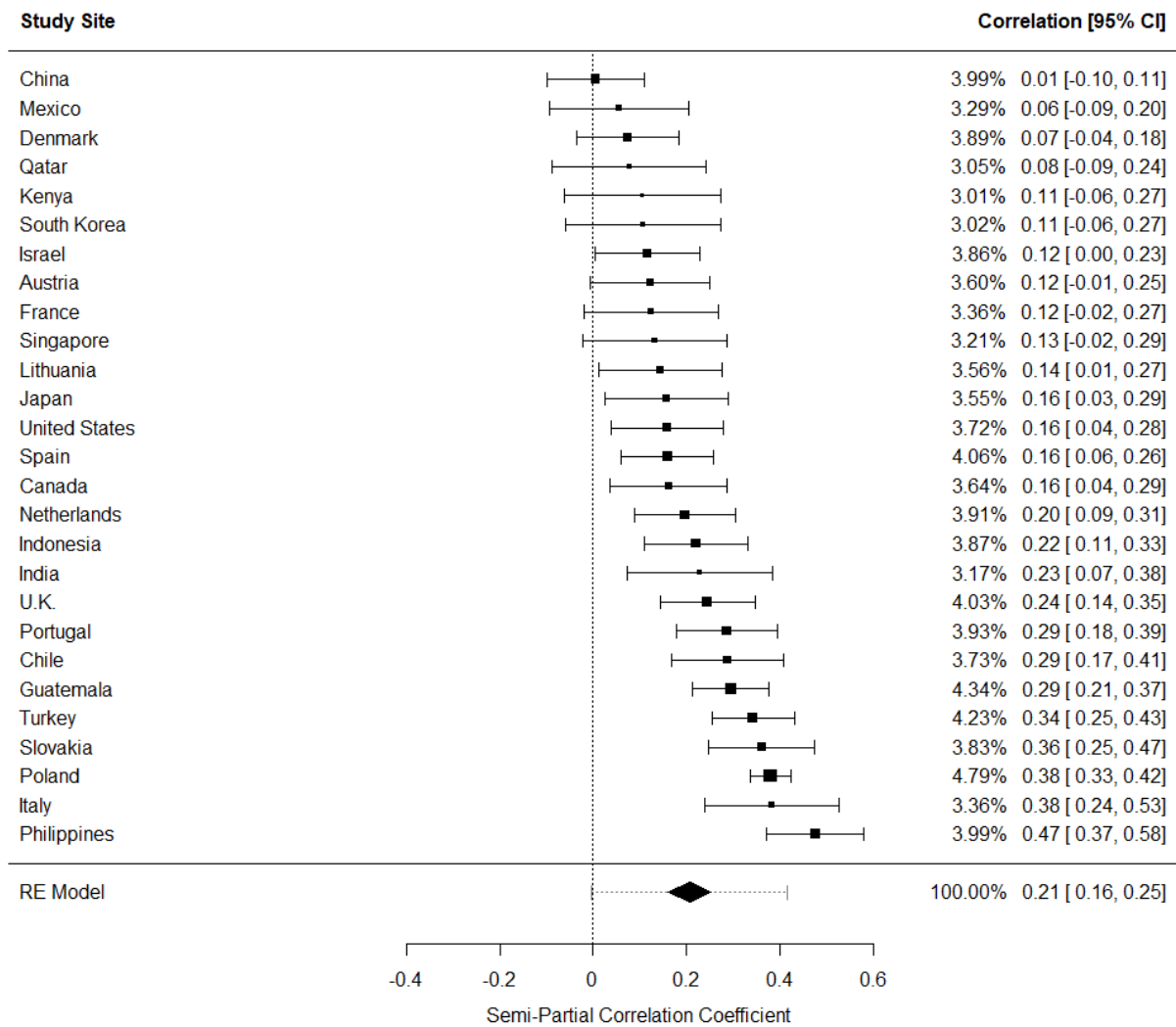
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Figure A3.8. Results of random-effects meta-analysis examining the semi-partial correlation between the traditionalism composite and the COVID-19 religious precautions composite after adjusting for the eight demographic and COVID-related covariates. Compare to Figure 3 in the main text.
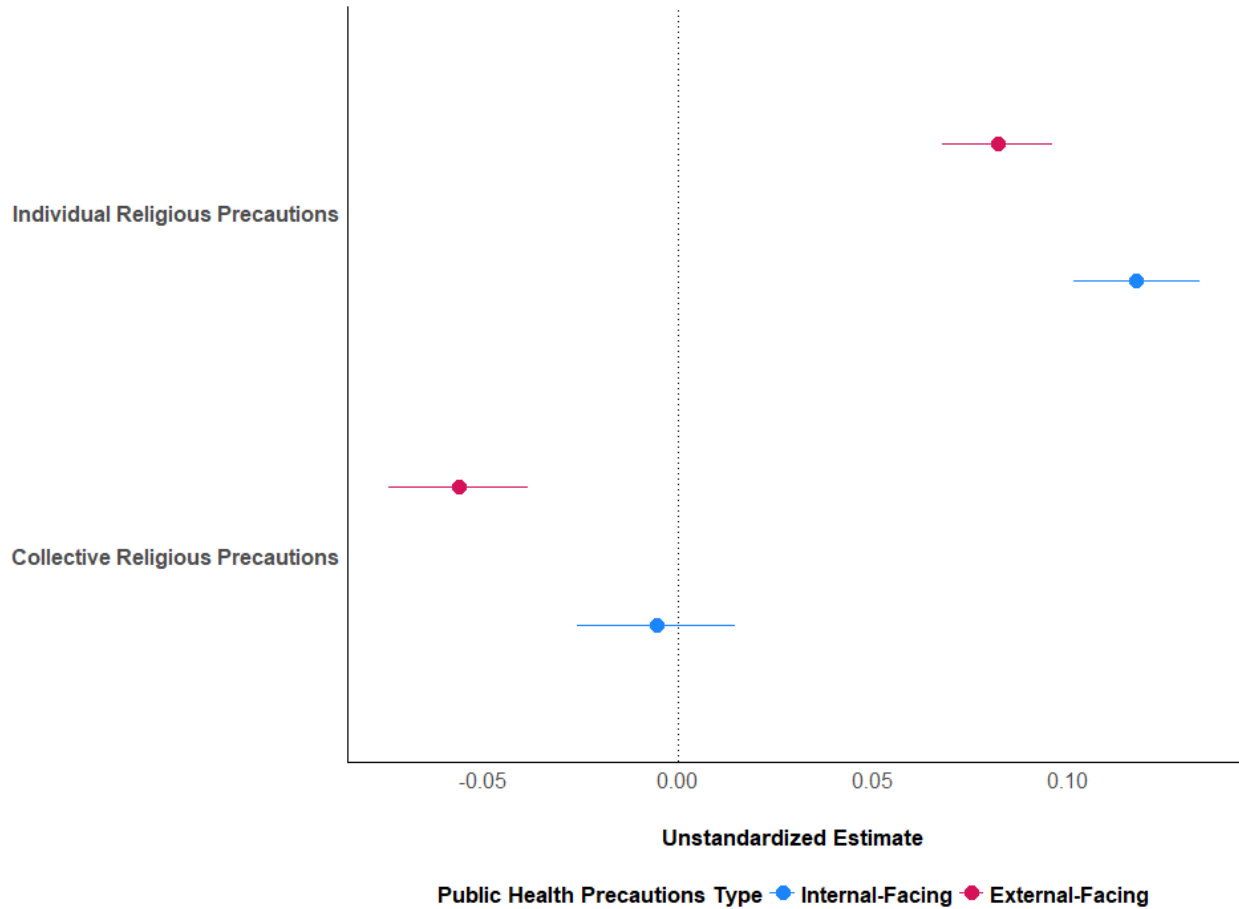
Figure A3.9. Effect of individual versus collective and internal- versus external-facing precautions on the relationship between religious and public health precautions. Results of two linear mixed models, simultaneously regressing internal- and external-facing public health precautions on individual and collective religious precautions respectively, controlling for demographic and COVID-19 related covariates. Lines indicate 95% confidence intervals. Compare to Figure 2 in main text.

Interaction	B	SE	t
Precautions mode x traditionalism interaction	.24	.02	13.55

Simple slopes			
Public health precautions and traditionalism correlation	.48	.01	34.99
Religious precautions and traditionalism correlation	.24	.01	17.24

Table A3.3. Results of model testing the interaction between precaution mode (religious versus public health precautions) and traditionalism, after adjusting for the eight demographic and COVID-related covariates. Compare to the model plotted in Figure 4 in the main text.

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