THE PSYCHOLOGY OF SCIENCE: MOTIVATED PROCESSING OF SCIENTIFIC EVIDENCE, AWARENESS, AND CONSEQUENCES

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ABSTRACT OF THE DISSERTATION

The Psychology of Science: Motivated Processing of Scientific Evidence, Awareness, and Consequences

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Although research on motivated reasoning has consistently shown that people’s beliefs bias their evaluation of the quality of belief-relevant evidence (a subjective judgment), few studies have examined whether people are biased in an absolute sense—that is, in how they interpret and recall research findings. Furthermore, theorists argue that people are largely unaware of their bias because they quickly rationalize their automatic acceptance or rejection of the information; however, the existing evidence in the literature seems to suggest that people may sometimes possess some awareness of their bias. In six studies, I investigated the extent to which people (1) exhibit bias in evaluating, recalling, and maintaining (vs. changing) their beliefs in response to belief-relevant evidence and (2) are aware of the bias they exhibit. I also examined whether exposure to belief-inconsistent (vs. consistent) evidence reduces general support for science. Participants exhibited bias in evaluating the quality of the evidence but accurately recalled the findings and shifted their beliefs in the direction of the evidence presented. Participants expressed some awareness of their bias, although awareness varied under different conditions. Belief-inconsistent (vs. consistent) evidence reduced
trust in research on the particular topic under investigation but did not strongly influence overall support for science. These findings extend previous research by clarifying the conditions under which defense and accuracy motivations guide information processing and contribute to belief maintenance vs. change. This work has important implications for determining how to reduce motivated reasoning to increase the broader impact of scientific research.
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The Psychology of Science: Motivated Processing of Scientific Evidence, Awareness, and Consequences

“At the end of the day, a discovery itself is not moral — it’s our application of it that has to pass that test.” – Neil deGrasse Tyson

A recent survey found that most Americans hold positive views of science: they believe that science has improved the quality of life for most people, has a positive impact on society, and that government investments in scientific research are worthwhile (Funk & Rainie, 2015). At the same time that people extol science, they distrust scientific findings. The majority of people report they have little or no trust in the accuracy and reliability of scientific findings (YouGov, 2013). While most scientists agree that humans evolved over time, that climate change is the result of human activity and is a major threat, and that childhood vaccinations do not cause autism and should be mandatory, 42% of American citizens believe in creationism (Newport, 2014), only 50% believe climate change is caused by human activity (Funk & Rainie, 2015), only 48% believe climate change is a major threat (Motel, 2014), over half of Americans are unsure whether vaccines cause autism (Newport, 2014), and only 68% believe that vaccinations should be mandatory (Funk & Rainie, 2015).

In response to statistics like these, scientists have called for increased science literacy among the American public. Neil deGrasse Tyson argues that, “We need a scientifically literate electorate — so that when you go to the polls, you can make an informed judgment and you can draw your own conclusions rather than tune into a particular TV station to have your conclusions handed to you.” Bill Nye claims that, “If we continue to eschew science … we are not going to move forward, we will not embrace natural laws, we will not make discoveries, we will not invent.”
Although such calls for science literacy are justified and important, they provide an oversimplified solution to the problem. Increasing people’s exposure to scientific evidence and allowing them to make “informed judgments” and “draw their own conclusions” may fail to change their beliefs on issues agreed upon by scientists. From a scientific perspective like deGrasse’s and Nye’s, the ideal world is one in which people are willing “to accept facts even when they are opposed to wishes” (Skinner, 1953). People would subject their cherished beliefs to rigorous analysis and investigation (Lilienfeld, 2010) and reason objectively, impartially evaluating evidence in the effort to arrive at unbiased conclusions (Nickerson, 1998). However, human motivation is not impartial, and judgment can be impaired by personal values and goals.

Over 40 years of research on confirmation bias and motivated reasoning has shown that people seek out and evaluate information in ways that are partial to their pre-existing views (Kunda, 1990; Nickerson, 1998). People selectively expose themselves to information supporting their views while ignoring or discrediting information incompatible with their beliefs (Kleck & Wheaton, 1967; Koriat, Lichtenstein, & Fischhoff, 1980). When presented with information challenging their views, people evaluate the quality of the evidence more harshly than they evaluate evidence supporting their beliefs (e.g., Ditto & Lopez, 1992; Lord, Ross, & Lepper, 1979; Munro & Ditto, 1997).

Theorists argue that people are largely unaware of their bias, quickly rationalizing their automatic acceptance or rejection of the information (Haidt, 2001; Koehler, 1993; Nickerson, 1998). However, little to no empirical evidence has demonstrated that people are completely unaware, on any level, of their bias. Additionally, although people exhibit
bias in how they evaluate the subjective quality of belief-relevant evidence, few studies have examined whether people are biased in how they interpret and recall research findings.

The present research sought to more closely examine (1) how people are biased when presented with belief-relevant evidence and (2) their awareness of their bias. This research also investigated (3) whether exposure to belief-inconsistent vs. consistent evidence affects overall support for science. Increasing our understanding of how people exhibit bias when presented with belief-relevant evidence, their awareness of their bias, and whether belief-threatening evidence reduces general support for science may provide critical insights into how science literacy can be improved.

**Motivated Reasoning**

Increasing people’s exposure to scientific evidence may fail to direct them to draw objective conclusions because motivations can distort people’s reasoning (Kunda, 1990; Nickerson, 1998). Research on motivated reasoning or confirmation bias has consistently shown that people easily accept information compatible with their views while strongly counter-arguing evidence challenging their beliefs (Ditto & Lopez, 1992; Lord et al., 1979; Munro & Ditto, 1997; Taber & Lodge, 2006). People rate research supporting their views as more valid, convincing, methodologically sound, and well done than research opposing their views. Indeed, studies have shown that individuals’ beliefs bias their evaluation of evidence and arguments on a wide range of topics, including capital punishment (Edwards & Smith, 1996; Lord et al., 1979; Liu & Ditto, 2013; MacCoun & Peletz, 2009; Miller, McHoskey, Bane, & Dowd, 1993; Munro, 2010; Pomerantz, Chaiken, & Tordesillas, 1995), gun control (MacCoun & Peletz, 2009;
Kahan, Peters, Dawson, & Slovic, 2013; Taber & Lodge, 2006), affirmative action (Crawford, 2012; Crawford, Jussim, Cain, & Cohen, 2013; Edwards & Smith, 1996; Miller et al., 1993; Taber & Lodge, 2006), same-sex relationships (Crawford et al., 2013; Munro & Ditto, 1997; Munro, 2010; Munro, Leary, & Lasane, 2004), gay/lesbian adoption, corporal punishment (Edwards & Smith, 1996), the gender salary gap (Stanovich & West, 2007), forceful interrogations, condom promotion, stem cell research (Liu & Ditto, 2013), abortion (Edwards & Smith, 1996; Stanovich & West, 2007, 2008), the drinking age (Stanovich & West, 2007, 2008), school prayer, the teaching of religion in schools, the treatment of prisoners of war (Crawford, 2012), homosexuals serving openly in the military (Zuwerink & Devine, 1996), medical marijuana (MacCoun & Peletz, 2009), and presidential debates (Munro, Ditto, Lockhart, Fagerlin, Gready, & Peterson, 2002).

Process models of motivated reasoning often depict motivated reasoning as affectively driven biased information processing (see Figure 1). Such models suggest that, upon exposure to belief-relevant information, an affective response is automatically activated (Lodge & Taber, 2005), which influences how easily people accept the evidence or how strongly they critically evaluate it. When information is consistent with individuals’ beliefs, they experience positive affect, which leads them to process the information heuristically and quickly assimilate it into their existing views (see Figure 1; Ditto & Lopez, 1992; Munro & Ditto, 1997; Klaczynski, 2000; Klaczynski & Gordon, 1996). However, when information challenges their beliefs, people experience negative arousal, which induces effortful processing aimed at disconfirming the evidence (Munro & Ditto, 1997; Munro et al., 2002; Jacks & Devine, 2000; Zuwerink & Devine, 1996).
Consistent with these models, researchers have found that, when presented with counter-attitudinal evidence, people analyze the information longer, generate more and stronger counterarguments in response to it, and list more flaws with the reasoning of the argument or the methodology of the research than they do in response to confirmatory evidence (see Figure 1; Ditto & Lopez, 1992; Ditto, Scepansky, Munro, Apanovitch, & Lockhart, 1998; Lord et al., 1979; Munro & Ditto, 1997; Taber & Lodge, 2006).

Many theorists argue that this differential skepticism demonstrates a “hot,” affectively driven motivated bias (Kunda, 1990; MacCoun, 1998; Taber & Lodge, 2006). However, other theorists argue that responding to belief-inconsistent evidence with greater skepticism than consistent evidence may often be driven by “cold” cognitive strategies that are quite logical (Fischhoff & Beyth-Marom, 1983; Koehler, 1993). Beliefs form from prior experience and exposure to evidence, and thus it may be rational to scrutinize evidence that deviates from prior experience more closely than evidence consistent with previous experience. In other words, it may often make sense to give more weight to prior evidence rather than completely change one’s view in response to new evidence (Tversky & Kahneman, 1974).

**Bias vs. Accuracy**

Indeed, people are motivated to defend their beliefs and values, but they are also motivated to be accurate (Hart, Albarracín, Eagly, Brechan, Lindberg, & Merrill, 2009). People can only arrive at desired conclusions if they are justifiable (Kunda, 1990). Because people are motivated to both maintain their beliefs and be accurate, the first broad question examined in this research was: When presented with belief-relevant
evidence, to what extent do people exhibit bias (vs. accuracy)—in evaluating, recalling, and drawing conclusions from the evidence?

Studies in the motivated reasoning literature have consistently shown that participants evaluate research supporting their views more favorably (e.g., rating it as more valid and methodologically sound) than research challenging their beliefs. People are clearly biased in how they evaluate the quality of belief-relevant evidence. However, evidence quality is (at least to some extent) a subjective judgment. Few studies in the motivated reasoning literature employ more objective or absolute measures of bias (i.e., those in which there is an objective, correct response). Therefore, it is unclear whether people are primarily biased in evaluating the quality of belief-relevant evidence or whether they are also biased in how they interpret and/or recall the evidence presented.

Some evidence suggests that people may exhibit motivated reasoning bias in how they interpret and recall information. For example, studies have shown that information supporting desired views about the self is more accessible and easily recalled than evidence reflecting less favorably upon the self (for a review, see Kunda, 1990). Furthermore, with respect to scientific evidence, Kahan and colleagues (2013) recently observed bias in the way people interpreted research findings. Kahan and colleagues (2013) presented participants with a 2x2 contingency table. In one condition, the table indicated the number of people who used a skin rash treatment and got better or worse and the number of people who did not use the treatment and got better or worse. In a second condition, participants were presented with the same table but were told the numbers represented the number of cities that had or had not enacted gun control bans and whether those cities saw an increase or decrease in crime rates. Based on the data
presented, participants had to decide whether the skin treatment or gun control ban was effective or not. In the skin treatment condition, participants were no more likely to interpret the results correctly if the data showed the treatment was effective or not. In the gun control condition, both gun control supporters and opponents were more likely to interpret the results correctly if they supported their views on gun control than if they challenged them, suggesting that participants’ political values biased their interpretation of the findings. Interestingly, these results seem to contradict current process models of motivated reasoning, in that participants in Kahan et al.’s (2013) study did not appear to be processing belief-inconsistent evidence more effortfully than those presented with belief-consistent evidence. Therefore, further examining whether and when motivated bias occurs in an absolute sense (i.e., when people deviate from an objective standard in interpreting and recalling information) is important to fully understand how motives influence the processing belief-relevant evidence.

Besides interpreting and evaluating belief-relevant evidence, people may also exhibit bias in whether or not they maintain or change their beliefs in response to the evidence. Certainly, the extent to which people maintain or change their views is likely influenced by their interpretation and evaluation of the findings. Even so, whether people change, retain, or strengthen their initial beliefs in response to belief-relevant evidence constitutes a different form of bias.

In one of the first studies on confirmation bias, Lord et al. (1979) presented strong proponents and opponents of capital punishment with two research reports: one indicating that capital punishment successfully deters murder, and another demonstrating that capital punishment fails to deter murder. Lord et al. (1979) found that, in response to
mixed evidence, participants believed they adopted even more polarized views supporting their original position (see also, Lord, Lepper, & Preston, 1984). Later research showed that, although participants were more likely to report that they adopted more polarized attitudes if they had strong prior attitudes toward capital punishment, a comparison of their attitudes measured before and after the manipulation revealed that no attitude change had actually occurred (Kuhn & Lao, 1996; Miller et al., 1993; Munro & Ditto, 1997). However, other researchers have found that, in response to mixed evidence, participants did adopt more polarized positions in the direction of their initial attitude (e.g., McHoskey, 1995; Taber & Lodge, 2006). These discrepancies highlight the importance of additional research examining when attitude polarization does and does not occur. Moreover, in prior studies, participants were presented with an evenly mixed pattern of findings. It remains unclear whether people retain or shift their beliefs when presented with a consistent pattern of findings supporting or challenging their views. The present research tested this question.

Thus, to date, research has shown that, when presented with belief-relevant evidence, people exhibit bias in evaluating the quality of belief-relevant evidence. However, the extent to which people exhibit bias when interpreting and recalling belief-relevant evidence has not been thoroughly explored, and mixed findings have been obtained regarding whether people adopt more polarized beliefs when presented with belief-threatening evidence. Therefore, the present research sought to further examine the extent to which people are biased vs. accurate in processing (i.e., evaluating, recalling, and maintaining vs. changing their beliefs in response to) belief-relevant evidence.

**Awareness of Bias**
Investigating the extent to which people exhibit bias when processing belief-relevant evidence is important because motivated reasoning can have a host of negative consequences. Motivated reasoning can interfere with people’s ability to draw accurate conclusions (Hart et al., 2009), preventing them from using scientific evidence effectively when making decisions (e.g., making health or safety decisions for themselves or others). Motivated reasoning may also impede researchers’ ability to reach a broader audience with their research (e.g., to increase public understanding of science and inform the development of effective applications in the public domain). Indeed, motivated reasoning can have a range of costs at the personal, interpersonal, intergroup, and societal levels. Motivated reasoning may also underlie the public’s general skepticism of social science research (Lilienfeld, 2012) and influence the support for and funding of particular research topics or fields. Moreover, scientists are not immune to motivated reasoning biases (Abramowitz, Gomes, & Abramowitz, 1975; Epstein, 2004; Lilienfeld, 2010; Mahoney, 1977; Redding, 2001), which can reduce the theoretical and empirical soundness of research studies, findings, and conclusions, and consequently, undermine the validity of scientific research (Jussim, Crawford, Anglin, Stevens, & Duarte, in press; Jussim et al., in prep).

Recognizing one’s potential for bias may be necessary to overcome bias (Wegener & Petty, 1997). Unfortunately, the dominant perspective in the motivated reasoning literature is that people are largely unaware that their reasoning is emotionally driven and biased. Theorists argue that people quickly rationalize their automatic acceptance or rejection of information and thus believe their reasoning is objective (Haidt, 2001; Koehler, 1993; Nickerson, 1998). If people are unaware that their beliefs
bias their evaluation of evidence, this poses a serious obstacle to reducing motivated reasoning in science.

However, the existing evidence bearing on this question of awareness seems to suggest that people may sometimes possess some awareness of their bias. Although research on the bias blind spot has shown that people believe others are more biased than they are themselves (Pronin et al., 2002), people still admit some degree of bias in these studies. For example, in one study (Hansen, Gerbasi, Todorov, Kruse, & Pronin, 2014), participants received either negative or positive false feedback on a social intelligence test and were asked to list only the weaknesses of the test (in the negative feedback condition) or only the strengths of the test (in the positive feedback condition). Participants were then asked to rate the quality of the test and the extent to which their evaluation strategy was biased. Participants who received negative feedback rated the quality of the test less favorably than did those who received positive feedback, and participants in both conditions rated their evaluation strategy as equally objective. Even so, participants in both conditions admitted some degree of bias, with those in the negative feedback condition rating their level of objectivity as a 4.76 on a 9-point scale, and those in the positive feedback condition rating their objectivity as a 5.75 (Hansen et al., 2014).

In another study, participants rated themselves on a range of positive and negative personality dimensions (Pronin et al., 2002). After completing the ratings, participants were informed that 70-80% of people demonstrate a “better-than-average-effect,” rating themselves as better than average on the positive characteristics and lower than average on the negative characteristics. When asked to indicate whether their responses had been
biased by this effect, 24% admitted that they did. Although this is a small portion of the sample, it suggests that some people did recognize their bias. Furthermore, recent research on prejudice reduction suggests that individual differences exist in racial bias awareness, and that recognizing bias motivates efforts to engage in prejudice reducing behaviors (Perry, Murphy, & Dovidio, 2015). Therefore, there is reason to believe that people may sometimes possess some awareness that their beliefs bias their evaluation of evidence.

Certainly, researchers advancing a dual-process model of motivated reasoning do not claim that people are completely unaware, on any level, that their reasoning is biased. However, the extent to which motivated reasoning occurs outside of awareness has not been directly tested. Therefore, the current research investigated the extent to which people are aware that their beliefs bias their evaluation of belief-relevant evidence, along with circumstances under which people may be more or less aware of their bias.

**Consequences for Science**

The third broad question examined in this research was how belief-relevant evidence influences perceptions of science. Besides strongly critiquing belief-threatening evidence, people sometimes explain away the findings by discounting that the topic can be studied scientifically (Munro, 2010). This “scientific impotence” effect has been demonstrated in two studies, in which participants presented with evidence challenging their views on homosexuality subsequently discounted the ability of science to study the topic, along with other unrelated topics as well (e.g., effects of TV on violence, accuracy of astrology in predicting personality traits, etc.; Munro, 2010). Moreover, after reading research summaries confirming or disconfirming their views on homosexuality,
participants were then asked to select which of five different sources (e.g., scientific research, opinions of others) to obtain further information on a different topic (i.e., the effectiveness of the death penalty). Participants who read summaries confirming their views on homosexuality were more likely to seek out scientific than non-scientific evidence to inform their views on the effectiveness of the death penalty, whereas those who read research challenging their views were no more likely to seek out scientific research than any of the other information sources. These findings suggest that, when people read scientific research challenging their views, they lose trust in research on the particular topic under investigation and in science more generally.

Furthermore, people may be more likely to distrust belief-threatening evidence collected using “soft” vs. “hard” scientific methods. In a recent study, participants were especially likely to rate belief-inconsistent evidence as lower in quality (less reliable, valid, objective, and relevant) than belief-consistent evidence when the evidence was obtained using behavioral vs. neuroscientific methodology (Munro & Munro, 2014). These findings are consistent with research suggesting that laypeople are skeptical of social science research, believing it is unscientific (Lilienfeld, 2012), less meaningful to society than other disciplines (Janda, England, Lovejoy, & Drury, 1998), that their daily life experiences provide them with adequate training in psychology (Kabatznick, 1984), and that people should trust their common sense and intuitions more than the results from social science research studies (Lilienfeld, 2012).

These negative views of social science research may be compounded by the fact that 78% of Americans believe that research is sometimes or often tainted by political ideology (YouGov, 2013). Indeed, people can also discount research findings challenging
their views by attributing the results to the researcher’s ideology. Research has shown that conservatives tend to believe that studies with liberal findings were conducted by liberal researchers (MacCoun & Peletz, 2009). However, in this study (MacCoun & Peletz, 2009), liberals did not attribute conservative findings to the conservatism of the researchers, possibly because scientists are overwhelmingly liberal (Gross & Simmons, 2007).

People’s skepticism of social science research may have important costs (e.g., reduced funding for social science research and hindering the advancement of knowledge). Resistance toward certain research findings and uncritical acceptance of others may adversely affect decisions and practices in every sector of society, leading to ineffective laws, policies, educational programs, and medical treatments (Lilienfeld, 2012; Teo, 2012). Therefore, it is critical to investigate the replicability and robustness of the scientific impotence effect, along with how counter-attitudinal evidence affects support for science more generally. The present research tested these questions.

**Overview of Present Research**

This research investigated people’s (1) bias (vs. accuracy) in evaluating, recalling, and maintaining their beliefs in response to belief-relevant research, (2) awareness of bias (under varied conditions), and (3) perceptions of science following exposure to belief-relevant evidence.

**Bias vs. Accuracy: To what extent are people biased in evaluating, recalling, and maintaining (vs. changing) their beliefs in response to belief-relevant findings?**

**Subjective bias, absolute bias, and belief maintenance (vs. change).** Measures of subjective bias, absolute bias, and belief maintenance (vs. change) were employed to
examine how people are biased when presented with belief-relevant evidence. To measure *subjective bias*, participants evaluated the quality of the evidence (Studies 2-6). *Subjective bias* was defined as higher quality ratings among those presented with belief-consistent (vs. belief-inconsistent) evidence. To measure *absolute bias*, participants were presented with several studies supporting or opposing their beliefs and were asked to recall the number (or percentage) of studies that showed that pattern (Studies 4-6). *Absolute bias* would emerge if participants presented with belief-consistent evidence over-estimated the number (or percentage) of studies favoring the group indicated by the research (i.e., their in-group) and/or if those presented with belief-inconsistent evidence under-estimated the number (or percentage) of studies favoring the group indicated by the research (i.e., their out-group). *Belief maintenance (vs. change)* was included as a third measure of bias, falling somewhere along the continuum from subjective to absolute (Studies 4-6). To assess belief maintenance (vs. change), participants reported their beliefs about the research question under investigation before and after the manipulation (Studies 5-6; and only after the manipulation in Study 4). On this measure, bias was defined as maintaining (or strengthening) one’s initial belief in response to belief-inconsistent evidence.

**Hypotheses.** Based on a long history of research on motivated reasoning and confirmation bias (see Kunda, 1990, for a review), I expected participants to exhibit subjective bias, evaluating the quality of belief-consistent evidence more favorably than belief-inconsistent evidence. Because Kahan et al. (2013) recently observed absolute bias in participants’ interpretations of belief-relevant findings, I predicted that participants would exhibit absolute bias in recalling the research findings (with those presented with
belief-consistent evidence over-estimating the percentage of studies favoring their group and/or those presented with belief-inconsistent evidence under-estimating the percentage of studies favoring their out-group). And based on research on belief perseverance and attitude polarization (Kuhn & Lao, 1996; Lord et al., 1979; McHoskey, 1995; Miller et al., 1993; Munro & Ditto, 1997; Taber & Lodge, 2006), I expected participants to maintain their beliefs in response to belief-inconsistent evidence.

**Awareness of Bias: When evaluating belief-relevant evidence, to what extent are people aware of their bias? Are there circumstances under which people are more or less aware of their bias?**

Awareness of motivated reasoning bias was examined in several ways.

**General susceptibility vs. specific instances.** In Study 1, participants rated their general susceptibility to motivated reasoning bias. In Studies 2-6, participants rated their bias in particular instances after reading about belief-relevant research.

**Indirect vs. direct self-report measures.** In this research, participants were asked to assess their bias both indirectly (i.e., “To what extent do you think your evaluation of this research was influenced by your pre-existing views;” Studies 2-6) and directly (i.e., “How biased do you think you were in evaluating this research?”; Studies 5-6).

**Awareness of the processes that define biased information processing.** To further assess awareness of bias, participants rated their defensiveness (Studies 3-6), skepticism, and effort critiquing research (Study 6), the affective and cognitive processes that define biased information processing.
Awareness of own vs. others’ bias: The bias blind spot. Research on the bias blind spot has shown that people believe others are more biased than they are themselves (e.g., Pronin et al., 2002). The present research sought to further examine perceptions of one’s own vs. others’ bias when evaluating belief-relevant evidence. Study 1 tested the bias blind spot with respect to people’s general susceptibility to motivated reasoning bias, and Study 3 examined the bias blind spot in specific instances. Study 3 tested the standard self-other bias blind spot, an in-group-out-group bias blind spot, and perceptions of the researchers’ bias.

Correspondence of self-reported bias with actual measures of bias. Besides examining overall ratings on the self-report of bias measures, awareness of bias was assessed by measuring correspondence with actual measures of bias (i.e., subjective bias, absolute bias, and belief maintenance vs. change; Studies 2-6).

Awareness of bias under varied conditions.

Explicitly evaluating research vs. reading about research under control conditions. To examine whether awareness of bias varies across different circumstances, awareness of bias was assessed under different conditions. Studies 4-6 investigated whether explicitly evaluating research (i.e., recording evaluations of research studies) increases awareness of bias. Explicitly evaluating research may prompt conscious, analytic processing, drawing attention to bias.

In real-world settings, people rarely record evaluations of research studies. Rather, they form automatic judgments of studies upon learning their outcomes. Awareness of bias in the absence of explicitly evaluating research (as occurs when people read belief-relevant evidence in a real-world setting) was examined in two ways. The
order in which participants explicitly evaluated the research in Studies 4-6 was randomized across participants, enabling a comparison of self-reports of bias between those who explicitly evaluated the research before assessing their bias to those who assessed their bias under control conditions (i.e., before evaluating the research). However, people may begin evaluating research as they read it. To determine whether evaluating research, even if not done explicitly, affects awareness of bias, participants predicted how biased they would be when evaluating research on a particular topic before they were informed of the research outcome (Study 6). These expectations for bias were then compared to self-reported bias after learning the outcome to the research.

When presented with belief-inconsistent vs. consistent evidence. According to current process models of motivated reasoning (Ditto & Lopez, 1992; Munro & Ditto, 1997; Klaczynski, 2000; Klaczynski & Gordon, 1996), people use heuristic processing to evaluate belief-consistent evidence and analytic processing to evaluate belief-inconsistent evidence. Because analytic processing is conscious and deliberate, people may be more aware of their bias when evaluating inconsistent (vs. consistent) evidence. Studies 2-6 tested this question.

Hypotheses. Based on research on the bias blind spot (e.g., Pronin et al., 2002) and racial bias awareness (Perry et al., 2015), I predicted that participants would demonstrate some awareness of their bias by rating themselves as slightly to somewhat biased on the various measures of bias (ratings of general susceptibility to bias and bias in specific instances, indirect and direct bias, and the affective and cognitive processes that define biased information processing), though I expected participants to rate others as more biased than themselves. In addition, I expected participants’ self-reports of bias
to correspond with the measures of actual bias. Because explicitly evaluating research and reading belief-inconsistent evidence may prompt conscious, analytic processing, drawing attention to bias, I predicted that participants would report greater bias when (1) explicitly evaluating the research before assessing their bias (vs. vice versa) and (2) when presented with belief-inconsistent (vs. consistent) evidence. If evaluating research even when not done explicitly (i.e., when forming an automatic evaluation of research upon learning its outcome) increases awareness of bias, than participants in Study 6 should report greater bias after learning the outcome to the research vs. before.

**Perceptions of Science: How does exposure to belief-inconsistent evidence, compared to belief-consistent evidence, influence support for science?**

**Attitudinal and behavioral measures.** To examine whether belief-inconsistent (vs. consistent) evidence reduced support for science, participants completed attitudinal and behavioral support for science measures. In Studies 2-6, participants rated the extent to which they believed the research topic under investigation could not be answered using scientific methods and reported their general support for science. In Study 4, participants were also asked to allocate $1.00, divided in whatever way they pleased, to the National Science Foundation and the Save the Tiger Fund, and were given the option to sign (or not) a letter to their representative advocating for increased funding for scientific research.

**Hypotheses.** Based on Munro’s (2010) research on the scientific impotence effect, I predicted that participants presented with belief-inconsistent, compared to consistent, evidence would (1) more strongly agree that the research topic could not be answered using scientific methods, (2) report lower general support for science, (3)
allocate less of their $1 to the NSF, and (4) be less likely to sign the letter to their representative advocating for increased funding for scientific research.

**Study 1**

The purpose of Study 1 was to gain some preliminary information regarding people’s lay understanding of motivated reasoning processes and their awareness of their own and others’ general susceptibility these biases. Based on research on the bias blind spot (e.g., Pronin et al., 2002) and racial bias awareness (Perry et al., 2015), I predicted that participants would report some awareness of the processes that define biased information processing and their general susceptibility to bias, though I expected participants to rate others as more biased than themselves.

**Participants**

A total of 88 students (33 men, 55 women; $M_{\text{age}} = 19.31$ years, $SD = 2.81$) from the psychology subject pool at Rutgers University completed this study in partial exchange for course credit. Overall, the sample was slightly left-leaning ($M_{\text{ideology}} = 4.50$, $SD = 1.28$) and identified as neither religious nor non-religious ($M_{\text{religiosity}} = 4.14$, $SD = 2.08$).

**Materials and Procedure**

**Beliefs about motivated reasoning.** To assess beliefs about motivated reasoning, participants were told that, “Research suggests that people strive to defend their beliefs when presented with information challenging their views.” They were then asked to describe, in a free-response format, *why* they think people are so motivated to defend their beliefs. Following this open-ended question, they were asked, in a forced-choice manner, whether the human motive to defend beliefs is generally advantageous or

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1 See Supplementary Materials for additional measures included in this study not described in the main text.
disadvantageous. They also rated the extent to which people *should* (1) give preference to information consistent with their beliefs and (2) consider information challenging their beliefs on 7-point scales, ranging from 1=not at all to 7=completely.

**Beliefs about others’ tendency to engage in motivated reasoning.** Three items were included to assess beliefs about how strongly other people engage in motivated reasoning processes. They were asked to rate the extent to which people (1) make a concerted effort to evaluate information objectively, (2) get defensive when presented with information challenging their views (1=not at all, 7=completely), and (3) how often they believe others ignore, discredit, or challenge belief inconsistent information (1=never, 7=always).

**Beliefs about own tendency to engage in motivated reasoning.** Participants then rated the extent to which they (1) make a concerted effort to evaluate information objectively, (2) get defensive when presented with information challenging their views, and (3) how often they ignore, discredit, or challenge belief inconsistent information (on the same 7-point scales).

**Affect.** Two measures assessed how participants feel when their beliefs are challenged. First, they responded to the open-ended question, “When your beliefs are challenged, how does it make you feel?” Second, they rated the extent to which 5 positive (e.g., good, proud; α = 0.88) and 7 negative (e.g., agitated, angry; α = 0.91) emotions describe how they feel when their beliefs are challenged.

**Demographics.** Last, participants reported their demographic information, including their political orientation and religiosity (on 7-point scales, with higher numbers representing a stronger liberal political orientation and stronger religiosity).

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2 One item (i.e., uncertain) was removed because it produced a low item-total correlation (<.21).
Content analysis. Two coders blind to the study’s goals were instructed to read through the responses to the open-ended items and inductively generate categories that captured the common responses to why people are motivated to defend their beliefs and how participants feel when their beliefs are challenged. Raters then coded each response into one of these categories. Inter-rater reliability was greater than 95% for all items, and discrepancies were resolved through discussion.

Results

Descriptive Statistics

See Table 1 for descriptive statistics on the continuous measures, and Table 2 for correlations among these measures.

How do you feel when your beliefs are challenged?

Many participants admitted that, when their beliefs are challenged, they feel threatened or defensive (25.0%), offended or insulted (17.0%), sad (9.1%), uncertain or confused (6.8%), or anxious (2.3%). However, a number of participants declared that having their beliefs challenged doesn’t bother them (19.3%) or provided a response that did not fit into these categories (20.5%).

Unsurprisingly, when rating their emotions, participants reported feeling greater negative ($M = 3.57, SD = 1.41$) than positive ($M = 2.70, SD = 1.38$) affect when their beliefs are challenged, $t(87) = 3.83$, $p < .001$.

Lay Beliefs about Motivated Reasoning

Why are people so motivated to defend their beliefs? Participants reported that people are motivated to defend their beliefs because their beliefs define who they are (30.7%), guide their life (18.2%), or are ingrained in them (5.7%). However, a
considerable number of participants reported that people are highly motivated to defend their beliefs because of their pride, stubbornness, or desire to be right (26.1%), because their beliefs are in fact correct (8.0%), or because they desire certainty (4.5%). A small subset of participants provided another response (6.8%).

Evaluations/Prescriptions.

Advantageous or disadvantageous? The majority of participants (80.7%) stated that the human motivate to defend beliefs is generally advantageous (vs. 19.3% who claimed it is disadvantageous).

Should people give preference to belief-consistent information and consider information challenging their views? Overall, participants reported that people should give some preference to information consistent with their beliefs ($M = 5.11$, $SD = 1.20$), but that they should also give some consideration to information challenging their views ($M = 5.20$, $SD = 1.13$). However, these two items were not correlated with one another, $r = .05$, $p = 0.64$, suggesting that participants who were more likely to report that individuals should give preference to belief-consistent information were not also more likely to report that people should consider alternative information.

Beliefs about Own and Others’ Engagement in Motivated Reasoning and the Bias Blind Spot

Overall, participants admitted that they sometimes ignore, discredit, and challenge information inconsistent with their beliefs ($M = 3.78$, $SD = 1.30$), get defensive when presented with information challenging their views ($M = 4.86$, $SD = 1.36$), and do not always remain objective when evaluating belief-relevant evidence ($M = 5.20$, $SD = 1.10$). However, participants rated others are more susceptible to motivated reasoning than
themselves. Participants reported that other people ($M = 5.13, SD = 0.95$) ignore, discredit, and challenge information inconsistent with their beliefs more often than they do ($M = 3.78, SD = 1.30$), $t(87) = 8.06, p < .001, d = 0.88$, others ($M = 5.78, SD = 1.00$) get more defensive when presented with information challenging their views than they do ($M = 4.86, SD = 1.36$), $t(87) = 5.55, p < .001, d = 0.60$, and that they ($M = 5.20, SD = 1.10$) make more of a concerted effort to remain objective than do others ($M = 3.66, SD = 1.65$), $t(87) = 7.81, p < .001, d = 0.85$ (see Figure 2).

**Summary**

There were several notable findings from Study 1. Participants expressed some awareness of their susceptibility to motivated reasoning processes. They reported experiencing some negative affect and defensiveness in response to information challenging their views and exhibiting some bias when evaluating belief-threatening evidence. However, consistent with research on the bias blind spot (Pronin et al., 2002), participants were more likely to recognize these biases in others than in themselves.

Participants offered relatively thoughtful responses to the question of why people are motivated to defend their beliefs. The self-concept was a central theme in many of the responses, demonstrating that people hold a lay understanding of some of the tenets of self-affirmation theory (see Sherman & Cohen, 2006). Interestingly, many participants reported that motivated reasoning is advantageous, that people should give preference to their beliefs, but that people should consider alternative information as well. People’s lay beliefs seem to support Bayesian perspectives regarding the logical nature and function of motivated reasoning processes (Fischhoff & Beyth-Marom, 1983; Koehler, 1993; Tversky & Kahneman, 1974).
Study 2

The results of Study 1 suggest that, to some extent, people recognize their general susceptibility to motivated reasoning. However, people may recognize their potential for bias but believe they are objective in any given instance when evaluating belief-relevant evidence. Therefore, Study 2 examined whether people are aware that their beliefs bias their evaluation of evidence when actually presented with belief-relevant evidence.

To assess awareness of bias when evaluating belief-relevant evidence, in Study 2, participants were presented with a research summary either supporting or opposing their beliefs. Participants evaluated the quality of the research (a subjective measure of bias) and were indirectly asked to assess their bias (rating the extent to which they believed their evaluation of the research was influenced by their pre-existing views). These methods enabled an examination of participants’ overall self-assessments of bias, along with how strongly self-reports of bias corresponded with an actual measure of bias (i.e., the subjective bias measure). Based on self-reports of bias in studies on the bias blind spot (e.g., Hansen et al., 2014), I predicted that participants would rate themselves as somewhat biased on the indirect measure. I also predicted that participants would exhibit some awareness of bias in that their self-reports of bias would correspond to the measure of actual bias.

People may be more aware of their bias when evaluating belief-inconsistent (vs. consistent) evidence because belief-inconsistent evidence prompts conscious, analytic processing (Munro & Ditto, 1997; Klaczynski, 2000). To test this question, Study 2 compared self-reports of bias between those presented with belief-consistent and inconsistent evidence. Lastly, Study 2 tested the prediction that participants presented
with belief-inconsistent, compared to consistent, evidence would (1) be more likely to
discount the ability of science to provide answers to the particular research question
under investigation and (2) report lower overall support for science.

Method

Design

This study employed a 2 (religious affiliation: religious vs. non-religious) x 2
(research findings: religion-enhancing vs. religion-disparaging) between-subjects design.

Participants

A total of 227 participants were recruited from Amazon’s Mechanical Turk.
Participants completed the study in exchange for $0.35. Of the 227, 31 failed the
manipulation check and were excluded from the sample. The final sample contained 196
participants (92 men, 93 women, 2 transgender, 9 unreported), ranging in age from 18 to
73 years ($M_{\text{age}} = 37.77$, $SD = 14.53$). In this sample, 96 participants identified as non-
religious, and 91 identified as religious (9 did not provide their religious orientation).

Materials and Procedure

Research summaries. Participants were first presented with a research summary.
They were instructed to read the summary carefully because they would be asked
questions to assess whether they read it. Participants were randomly assigned to receive
one of two research summaries, indicating that religiosity is associated with a range of
positive or negative outcomes. The summaries were identical, except for the direction of
the findings:

“A group of researchers recently conducted a study examining the relationship
between religiosity and psychological well-being and life outcomes. The researchers
surveyed a sample of 800 participants, 400 who identified as religious and 400 who identified as non-religious. They found that religious participants were significantly [more/less] likely to be divorced and to suffer from anxiety and depression than were the non-religious participants. Religious participants also reported [lower/greater] life satisfaction and had significantly [lower/higher] incomes than did the non-religious participants surveyed. From their findings, the researchers concluded that religiosity is associated with a range of [negative/positive] outcomes (psychological, interpersonal, and vocational).”

Manipulation check. After the summary, participants were presented with two multiple-choice questions assessing how closely they read it. They were asked how many people participated in the study (200, 400, 800, or 1600) and what the researchers concluded (that religiosity was associated with a range of positive outcomes, negative outcomes, was unrelated to life outcomes, or that the relationship between religiosity and life outcomes was inconclusive). Because the first question did not directly assess whether the manipulation was successful, only the second question was used to exclude participants who provided incorrect answers.

Subjective bias. Following the manipulation check, participants responded to four questions assessing subjective bias, or participants’ evaluations of the evidence quality. They rated how convincing they found the study, how well it was conducted, how valid they believed the findings were, and the strength of the researchers’ conclusions on 8-point scales, in which low ratings represented highly unfavorable evaluations of the study and high ratings represented highly favorable evaluations. These four items were averaged to create an overall measure of subjective bias ($\alpha = 0.95$).
**Discounting science.** On an 8-point scale ranging from 1=strongly disagree to 8=strongly agree, participants rated the extent to which they agreed with the statement that, “The question addressed by this study (i.e., the association between religiosity and psychological well-being and life outcomes) is one that cannot be answered using scientific methods.”

**Indirect self-assessment of bias.** Participants then rated the extent to which they believed their evaluation of the study was influenced by their personal views on religiosity and its relationship to psychological well-being and life outcomes (1=not at all, 7=completely).

**Support for science.** Two items assessed participants’ general support for scientific research: “To what extent do you support scientific research?” and “How often do you trust the results of scientific research studies?” These items were rated on 7-point scales, with higher numbers representing stronger support for research. Because the items were strongly correlated, $r = 0.64$, they were averaged into a single support for science measure ($\alpha = 0.77$).

**Demographics.** Participants reported their demographic information, including their religiosity. Religiosity was rated on a 6-point scale. Participants who strongly disagreed, disagreed, or somewhat disagreed with the statement, “I consider myself a religious individual” were classified as non-religious; those who somewhat agreed, agreed, or strongly agreed with this statement were classified as religious.

**Results**

**Descriptive Statistics**
See Table 3 for descriptive statistics and Table 4 for correlations among the study measures.

**Subjective Bias**

To test for subjective bias, a two-way between-subjects ANOVA was conducted, examining the effects of research findings (religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious) on ratings of research quality. Subjective bias would be demonstrated if religious participants in the religion-enhancing condition rated the research more favorably than religious participants in the religion-disparaging condition, and non-religious participants in the religion-disparaging condition rated the research more favorably than non-religious participants in the religion-enhancing condition.

There were no main effects for research findings, $F(1, 183) = 1.84, p = 0.18$, or religious orientation, $F(1, 183) = .99, p = 0.32$. However, there was a significant research findings x religious orientation interaction, $F(1, 183) = 40.69, p < .001, d = 0.94$. Simple effects performed on religious orientation revealed subjective bias among both religious and non-religious participants (i.e., the classic confirmation bias effect): religious participants rated the religion-enhancing study ($M = 5.63, SD = 1.36$) more favorably than the religious-disparaging study ($M = 3.81, SD = 1.91$), $t(89) = -5.27, p < .001$, whereas non-religious participants rated the religion-disparaging study ($M = 5.07, SD = 1.55$) more favorably than the religion-enhancing study ($M = 3.89, SD = 1.58$), $t(94) = 3.69, p < .001$ (see Figure 3).
Across levels of religiosity, participants rated belief-consistent evidence ($M = 5.35, SD = 1.49$) more favorably than belief-inconsistent evidence ($M = 3.85, SD = 1.74$), $t(185) = -6.36, p < .001, d = 0.93$ (see Figure 4).

**Awareness of Bias**

**Indirect self-assessment of bias ratings.** Overall, participants reported that their evaluations of the research were somewhat influenced by their pre-existing views ($M = 4.17, SD = 1.73$).

**Correspondence with subjective bias measure.** Awareness of bias was further assessed by examining correspondence between the indirect self-assessment of bias measure and subjective bias. If participants were aware that their beliefs biased their evaluation of evidence, then (indirect) self-reported bias should be positively associated with subjective bias for consistent evidence (i.e., participants should rate themselves as more biased when evaluating belief-consistent evidence more favorably) but negatively associated with subjective bias for inconsistent evidence (i.e., participants should rate themselves as more biased when evaluating belief-inconsistent evidence more harshly).

To examine whether study consistency moderated the relationship between indirect self-reported bias and subjective bias, a consistency variable was created: religious participants who read the religion-disparaging study and non-religious participants who read the religion-enhancing study were combined into a belief-inconsistent group, and religious participants who read the religion-enhancing study and non-religious participants who read the religion-disparaging study were combined into a belief-consistent group.
Mirroring the results from the ANOVA analyses, study consistency predicted subjective bias (i.e., study evaluations), $\beta = .42$, $B = 1.50$, $SE = .24$, $t = 6.32$, $p < .001$; participants rated the study more favorably when it was congruent with their religious beliefs than when it was not. Indirect self-reported bias did not predict subjective bias, $\beta = .06$, $B = .06$, $SE = .07$, $t = .86$, $p = 0.39$, but there was a significant study consistency x indirect self-reported bias interaction, $\beta = 1.18$, $B = .61$, $SE = .13$, $t = 4.64$, $p < .001$ (see Table 5). Simple slopes analyses indicated that, when the study was inconsistent with participants’ beliefs, those who rated their evaluations as more influenced by their pre-existing views evaluated the quality of the research more harshly, $\beta = -.26$, $B = -.28$, $SE = .11$, $t = -2.57$, $p = .01$, whereas when the study was consistent with their beliefs, those who rated their evaluations as more influenced by their pre-existing views evaluated quality of the research more favorably, $\beta = .41$, $B = .33$, $SE = .08$, $t = 4.27$, $p < .001$ (see Table 5). The strength of the relationship (i.e., the absolute value of the coefficients) between indirect self-reported bias and subjective bias did not significantly differ between those presented with belief-consistent and belief-inconsistent evidence, $z = 1.14$, $p = 0.25$.

**Belief-consistent vs. belief-inconsistent evidence.** To examine whether participants reported greater bias when presented with belief-inconsistent vs. consistent evidence, two sets of analyses were performed. First, a two-way ANOVA tested the effects of research findings and religious orientation on participants’ (indirect) self-reports of bias. This analysis yielded a marginally significant main effect for religious orientation, $F(1, 182) = 3.70$, $p = .056$, $d = 0.29$, such that religious participants ($M = 4.43$, $SD = 1.77$) tended to rate their evaluations as more influenced by their pre-existing
views than did non-religious participants ($M = 3.95, SD = 1.67$). There was no main effect for research findings, $F(1, 182) = .33, p = 0.56$, nor was there a research findings x religious orientation interaction, $F(1, 182) = .44, p = 0.51$.

Next, to assess whether, across levels of religiosity, participants believed their evaluations were more influenced by their pre-existing views when presented with belief-inconsistent vs. consistent evidence, an independent samples $t$-test compared indirect self-reports of bias between those presented with belief-consistent and inconsistent evidence. The results of this analysis were non-significant, $t(184) = .61, p = 0.54$, suggesting that participants believed their evaluations of the research were equally influenced by their pre-existing views, regardless of whether or not the study was congruent with their beliefs (see Table 3 and Figure 5).

**Discounting vs. Supporting Science**

**Discounting the ability of science to study the particular research question.**

To test whether participants were more likely to discount the ability of science to provide answers to the research topic under investigation when presented with belief-inconsistent (vs. consistent) evidence, two sets of analyses were performed. First, a two-way ANOVA examined the effects of research findings and religious orientation on the extent to which participants believed the research question could not be addressed using scientific methods. The main effects for research findings, $F(1, 183) = .05, p = 0.82$, and religious orientation, $F(1, 183) = .45, p = 0.50$, were nonsignificant, but there was a marginally significant research findings x religious orientation interaction, $F(1, 183) = 3.78, p = .053, d = 0.29$. However, neither simple effects analysis comparing the extent to which religious, $t(89) = 1.19, p = 0.24$, and non-religious, $t(94) = -1.57, p = 0.12$, individuals
discounted the ability of science to provide answers to the research question reached statistical significance (see Figure 6).

Second, an independent groups t-test was performed to examine whether, across levels of religiosity, participants were more likely to discount the ability of science to provide answers to the research question when presented with belief-inconsistent (compared to belief-consistent) evidence. Participants presented with belief-inconsistent evidence \( (M = 4.57, SD = 1.95) \) were marginally more likely to discount the ability of science to provide answers to the research question than were those presented with belief-consistent evidence \( (M = 4.02, SD = 1.92) \), \( t(185) = 1.94, p = .054, d = 0.28 \) (see Figure 7).

**Support for science in general.** An additional two-way ANOVA was performed to examine the effects of research findings and religious orientation on participants’ general support for science. If belief-threatening evidence reduced support for science, then religious participants in the religion-disparaging condition should report lower support for science religious participants in the religion-enhancing condition, and non-religious participants in the religion-enhancing condition should report lower support for science than non-religious participants in the religion-disparaging condition. The was no main effect for research findings, \( F(1, 183) = .04, p = .84 \), but there was a main effect for religious orientation, \( F(1, 183) = 15.50, p < .001, d = 0.59 \). Non-religious participants \( (M = 5.56, SD = .88) \) reported greater support for science than did religious participants \( (M = 5.00, SD = 1.07) \). The research findings x religious orientation interaction was nonsignificant, \( F(1, 183) = .94, p = 0.33 \) (see Figure 8).
A second analysis was performed to examine whether, across levels of religiosity, participants presented with belief-inconsistent evidence reported lower overall support for science than did those presented with belief-consistent evidence. The results of this analysis were also non-significant, $t(185) = -0.84, p = 0.40$ (see Figure 9).

**Summary**

Study 2 replicated the classic confirmation bias effect: participants exhibited subjective bias, rating research supporting their beliefs more favorably than research opposing their views.

Extending previous research, Study 2 investigated people’s awareness of their bias when presented with belief-relevant evidence. When asked indirectly (i.e., when the word “bias” was not explicitly stated), participants expressed some awareness of the bias they exhibited when evaluating the evidence. Overall, participants rated their evaluations of the research as somewhat influenced by their pre-existing views. Furthermore, these (indirect) self-reports of bias showed moderate correspondence with an actual measure of bias.

Overall ratings on the indirect self-assessment of bias measure did not differ between those presented with belief-consistent and belief-inconsistent evidence, nor did they differ in their correspondence with an actual measure of bias. These findings could either reflect the fact that people are equally biased when evaluating belief consistent and inconsistent information or that people are not cognizant of differences in their level of bias when evaluating each type of evidence.

Study 2 provided some support for the scientific impotence effect (Munro, 2010), though it only emerged when examined across levels of religiosity. There was no effect
of belief-relevant evidence on participants’ general support for science. These findings suggest that belief-relevant evidence may have some influence on trust in research on the particular topic under investigation but does not affect overall support for science. This pattern was further explored in Study 3.

**Study 3**

The main purpose of Study 3 was to test the replicability of the findings from Study 2 (i.e., that participants exhibited some awareness of their bias, that there was no difference in self-reports of bias between those presented with belief-consistent and belief-inconsistent evidence, and that belief-relevant evidence had some influence on trust in research on the particular topic under investigation but not on general support for science). To test for replication, the same religiosity study manipulation was used in Study 3, along with an additional manipulation pertaining to political ideology and analytic ability. Manipulating an additional research finding enabled a test of the generalizability of the findings across research topics, along with a test of whether two separate belief-relevant studies have a combined influence on participants’ support for science. Although the results of a single study challenging one’s views may not lead an individual to lose trust in science, the repeated presentation of research findings challenging one’s beliefs may have a stronger impact on overall support of science.

An additional goal of Study 3 was to further explore the bias blind spot effects observed in Study 1, examining evaluations of self and other bias, in-group and out-group members’ bias, and the researchers’ bias. Previous research suggests that people attribute research findings to the researchers’ ideology, except when the findings reflect conservative themes (MacCoun & Peletz, 2009), possibly because there are so few
conservative social scientists. The present study investigated the replicability of these findings, examining whether people discount research findings challenging their views by attributing them to the researchers’ ideology, and whether this effect occurs primarily among conservatives.

**Method**

**Design**

This study employed a 2 (religious affiliation: religious vs. non-religious) x 2 (political orientation: liberal vs. conservative) x 2 (religiosity study findings: religion-enhancing vs. religion-disparaging) x 2 (political ideology study findings: liberal-enhancing vs. conservative-enhancing) between-subjects design.

**Participants**

A total of 323 participants were recruited from Amazon’s Mechanical Turk. Participants completed the study in exchange for $0.40. Of the 323, 31 failed at least one of the manipulation checks and were excluded from the sample. The final sample contained 292 participants (103 men, 186 women, 3 transgender), ranging in age from 19 to 82 years ($M_{age} = 39.06$, $SD = 14.01$). In this sample, 149 participants identified as non-religious and 143 identified as religious, and 94 identified as conservative and 198 identified as liberal.

**Materials and Procedure**

Participants were randomly presented with one of two religiosity research summaries (religion-enhancing vs. religion-disparaging) and one of two political ideology research summaries (liberal-enhancing vs. conservative-enhancing). The order
in which participants received each summary (religiosity and political ideology) was also randomized.

**Religiosity research summary.** The religiosity research summaries used in Study 3 were identical to the ones used in Study 2, with two exceptions. First, “A group of researchers” was replaced with, “In 2009, Robinson and Kane,” to differentiate the religiosity summary from the political one and to heighten the believability of the research. Second, “The researchers surveyed a sample of 800 participants, 400 who identified as religious and 400 who identified as non-religious” was replaced with “The researchers surveyed a random sample of 800 participants,” so that the sample could be described as random. As before, the summary either stated that religiosity was associated with a range of positive or negative outcomes.

**Political ideology research summary.** An additional (fictitious) research summary was developed to assess reactions to research pertaining to individuals’ political views. This summary either stated that a liberal or conservative political ideology was associated with greater analytic ability:

> “May and Jacobs (2012) recently conducted a study examining the relationship between political orientation and analytic reasoning skills. The researchers administered a validated analytical reasoning test to a sample of 1,000 participants and had them report their political orientation. The results showed that participants who identified as [liberal / conservative] performed better on the test than did those who identified as [conservative / liberal]. From their findings, the researchers concluded that a [liberal / conservative] political ideology is associated with greater analytic ability.”
**Manipulation checks.** After each summary, participants were presented with two multiple-choice questions assessing how closely they read it. They were asked how many people participated in the study and what the researchers concluded. Only the second question was used to exclude participants who provided incorrect answers because it directly assessed whether the manipulation was successful.

**Subjective bias.** Following the manipulation checks for each summary, participants responded to the four study evaluation questions from Study 2 (religiosity study evaluations: $\alpha = .95$; political study evaluations: $\alpha = .94$).

**Discounting science.** On an 8-point scale ranging from 1=strongly disagree to 8=strongly agree, participants then rated the extent to which they agreed with the statement that, “The question addressed by this study (i.e., the association between [religiosity and psychological well-being and life outcomes / political orientation and analytic ability]) is one that cannot be answered using scientific methods.”

**Indirect assessments of bias.** Participants assessed their own bias in evaluating each study, along with the bias they believed would be or was exhibited by others, their in-group, their out-group, and the researchers themselves. For each target, participants rated the extent to which the target was or would be influenced by their personal views, made or would make a concerted effort to remain objective, and became or would become defensive. (The defensive question was omitted for the researchers). Participants first assessed others’ bias, followed by their own bias, out-group members’ bias, in-group members’ bias, and the researchers’ bias. All questions were rated on 7-point scales, with higher scores representing greater bias, objectivity, and defensiveness. Because the reliability of these 3 items (with objectivity reverse-coded) varied for each target and for
each study (α’s ranged from .28 to .77), the items were examined separately rather than combined, unless otherwise noted.

Researchers’ ideology. After the bias questions, participants were asked to rate the researchers’ religious or political orientation (religious orientation for the religious study and political orientation for the political study), on a 7-point scale ranging from 1 (not at all religious/strongly conservative) to 7 (extremely religious/strongly liberal). Participants were also given the option to select “Don’t Know.”

Support for science. Two items assessed participants’ general support for scientific research: “To what extent do you support scientific research?” and “How often do you trust the results of scientific research studies?” These items were rated on 7-point scales, with higher scores representing stronger support for research. Because the items were strongly correlated, $r = .60$, they were averaged into a single support for science measure ($\alpha = .74$).

Demographics. Participants reported their demographic information, including their religiosity and political orientation. Religiosity and political orientation were rated on 6-point scales, in which higher scores represented stronger religiosity and a stronger liberal political ideology. These variables were dichotomized to separate participants into religious and non-religious, and liberal and conservative, groups.

Suspicion check. Lastly, participants were asked to describe, in 1-2 sentences, what they thought was the purpose of the study. Responses were coded for whether they did, did not, or partially guessed the purpose of the study.

Results

Descriptive Statistics
See Table 6 for descriptive statistics and Table 7 for correlations among the primary study measures. Correlations among perceived self, other, in-group, out-group, and researcher bias are presented in Table 8.

**Suspicion Check**

86 participants failed to provide an answer to the suspicion check question. Of the remaining 206 responses, 47.6% did (N = 98), 36.9% did not (N = 76), and 15.5% partially guessed (N = 32) the purpose of the study.

**Subjective Bias**

**Religiosity study.** A two-way between-subjects ANOVA tested the effects of the religiosity study research findings (religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious) on ratings of research quality. Main effects emerged for research findings, $F(1, 288) = 6.89, p < .01, d = 0.28$, and religious orientation, $F(1, 288) = 5.86, p = .02, d = 0.26$. Overall, participants rated the religion-enhancing study ($M = 4.89, SD = 1.73$) more favorably than the religion-disparaging study ($M = 4.40, SD = 1.82$), and religious participants ($M = 4.88, SD = 1.93$) rated the research more favorably than did non-religious participants ($M = 4.41, SD = 1.62$).

There was also a significant research findings x religious orientation interaction, $F(1, 288) = 57.57, p < .001, d = 0.88$. Simple effects performed on religious orientation revealed subjective bias among both religious and non-religious participants: religious participants rated the religion-enhancing study ($M = 5.82, SD = 1.39$) more favorably than the religious-disparaging study ($M = 3.92, SD = 1.52$), $t(141) = -6.89, p < .001$, and non-religious participants rated the religion-disparaging study ($M = 4.86, SD = 1.59$)
more favorably than the religion-enhancing study \((M = 3.88, SD = 1.59), t(147) = 3.69, p < .001^3\) (see Figure 3).

Across levels of religiosity, participants rated the research more favorably when presented with belief-consistent \((M = 5.33, SD = 1.56)\) vs. inconsistent \((M = 3.90, SD = 1.73)\) evidence, \(t(390) = -7.38, p < .001, d = 0.87\) (see Figure 4).

**Study purpose.** A three-way religious study research findings x religious orientation x awareness of study purpose (yes vs. no vs. partially) ANOVA was performed to examine whether participants’ awareness of the purpose of the study reduced subjective bias. The three-way interaction among research findings, religious orientation, and awareness of study purpose was non-significant, \(F(2, 194) = .24, p = 0.79\), indicating that participants’ awareness of the study purpose did not reduce subjective bias exhibited in response to the religiosity study.

**Political study.**^4^ A two-way ANOVA tested the effects of the political study research findings (liberal-enhancing vs. conservative-enhancing) and political orientation (liberal vs. conservative) on ratings of research quality. The main effects for research findings, \(F(1, 288) = .58, p = 0.45\), and political orientation, \(F(1, 288) = .02, p = 0.88\), were non-significant, but there was a significant research findings x political orientation interaction, \(F(1, 288) = 55.75, p < .001, d = 0.88\). Simple effects performed on political orientation revealed subjective bias among both liberal and conservative participants: liberal participants rated the liberal-enhancing study \((M = 5.31, SD = 1.45)\) more favorably than the conservative-enhancing study \((M = 3.65, SD = 1.66), t(196) = -7.39, p < .001\), whereas conservative participants rated the conservative-enhancing study \((M =

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^3^ There were no effects of study order (religiosity study first vs. political study first) on the religiosity study evaluations.

^4^ See Supplementary Materials for relationship between religiosity and political study evaluations.
5.19, $SD = 1.60$) more favorably than the liberal-enhancing study ($M = 3.83, SD = 1.69$), $t(92) = 3.93, p < .001$ (see Figure 10).

Across political orientation, participants rated the research more favorably when presented with belief-consistent ($M = 5.27, SD = 1.50$) vs. inconsistent ($M = 3.71, SD = 1.67$) evidence, $t(290) = -8.31, p < .001, d = 0.98$ (see Figure 4).

**Study purpose.** A three-way political study research findings x political orientation x awareness of study purpose (yes vs. no vs. partially) ANOVA was performed to examine whether participants’ awareness of the purpose of the study reduced subjective bias. The three-way interaction among research findings, political orientation, and awareness of study purpose was non-significant, $F(2, 194) = 0.15, p = 0.86$, indicating that participants’ awareness of the study purpose did not reduce subjective bias exhibited in response to the political study.

**Awareness of Bias**

**Overall ratings.** As in Study 2, participants reported that their evaluations of the religiosity ($M = 4.11, SD = 1.86$) and political study ($M = 4.05, SD = 1.81$) were somewhat influenced by their pre-existing views. In Study 3, participants also reported how defensive they felt and how objective they believed they were when evaluating the study. Although participants acknowledged that their evaluations of the studies were influenced by their pre-existing views, they believed they exerted a moderately strong effort to remain objective when evaluating the religiosity ($M = 5.22, SD = 1.40$) and political studies ($M = 5.18, SD = 1.38$), and felt only slightly defensive when evaluating the religiosity ($M = 2.28, SD = 1.73$) and political studies ($M = 2.55, SD = 1.85$).

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5 There were no effects of study order (religiosity study first vs. political study first) on political study evaluations.
Perceptions that evaluations were influenced by pre-existing views were positively associated with perceived defensiveness for both the religiosity and political studies, and negatively associated with perceived objectivity for the political study (the relationship was marginal for the religiosity study; see Table 7). Participants who reported greater (indirect) bias in response to the religiosity study also reported greater (indirect) bias in response to the political study, $r = 0.36, p < .001$. The same pattern was observed for defensiveness and objectivity (see Table 7). These findings suggest that people associate defensiveness (and compromised objectivity) with bias and that individual differences may exist in people’s awareness of bias.

**Correspondence with subjective bias measure.** AWARENESS OF BIAS WAS FURTHER ASSESSED BY EXAMINING CORRESPONDENCE BETWEEN THE INDIRECT SELF-ASSESSMENT OF BIAS MEASURES AND SUBJECTIVE BIAS. IF PARTICIPANTS WERE AWARE THAT THEIR BELIEFS BIASED THEIR EVALUATION OF EVIDENCE, THEN SELF-ASSESSMENTS OF BIAS SHOULD BE POSITIVELY ASSOCIATED WITH RATINGS OF RESEARCH QUALITY FOR CONSISTENT EVIDENCE AND NEGATIVELY ASSOCIATED WITH RATINGS OF RESEARCH QUALITY FOR INCONSISTENT EVIDENCE.

**Religiosity study.** A regression analysis was performed to examine whether religiosity study consistency (belief-consistent vs. belief-inconsistent) moderated the relationship between self-assessment of bias (in response to the religiosity study) and ratings of the religiosity study research quality (i.e., subjective bias). The self-assessment of bias measure and study consistency were entered as predictors of subjective bias in Step 1, and a study consistency x self-assessment of bias interaction term was entered in Step 2.

6 See Supplementary Materials for correspondence of defensiveness and objectivity with subjective bias.
Mirroring the results from the ANOVA analyses, study consistency predicted subjective bias, $\beta = .41$, $B = 1.47$, $SE = .19$, $t = 7.59$, $p < .001$, such that participants rated the study more favorably when the results were consistent versus inconsistent with their religious views. Indirect self-reported bias was not a significant predictor of study evaluations, $\beta = .10$, $B = .10$, $SE = .05$, $t = 1.82$, $p = .07$. However, there was a significant study consistency x indirect self-reported bias interaction, $\beta = .94$, $B = .50$, $SE = .10$, $t = 4.95$, $p < .001$ (see Table 5). Simple slopes analyses indicated that, when the study was inconsistent with participants’ religious beliefs, those who reported that their evaluations were more strongly influenced by their pre-existing views evaluated the quality of the research more harshly, $\beta = -.17$, $B = -.16$, $SE = .08$, $t = -2.04$, $p = .04$, whereas when the study was consistent with their religious beliefs, participants who reported that their evaluations were more strongly influenced by their pre-existing views evaluated the research quality more favorably, $\beta = .40$, $B = .34$, $SE = .06$, $t = 5.27$, $p < .001$ (see Table 5). A test of the difference between the strength of the coefficients (i.e., the absolute value of the coefficients) revealed that the relationship between indirect self-reported of bias and subjective bias was stronger for those presented with belief-consistent evidence than those presented with belief-inconsistent evidence, $z = 2.13$, $p = 0.03$.

**Political study.** A regression analysis was also performed to test whether political study consistency moderated the relationship between self-assessment of bias (in response to the political study) and subjective bias (i.e., political study evaluations). Study consistency predicted subjective bias, $\beta = .45$, $B = 1.60$, $SE = .19$, $t = 8.38$, $p < .001$, such that participants rated the study more favorably when it was consistent vs. inconsistent with their political orientation. Indirect self-reported bias was not a
significant predictor of subjective bias, $\beta = .06$, $B = .06$, $SE = .05$, $t = 1.14$, $p = .26$; however, there was a significant study consistency x indirect self-reported bias interaction, $\beta = .49$, $B = .28$, $SE = .10$, $t = 2.65$, $p < .01$ (see Table 5). Simple slopes analyses indicated that, when the study was inconsistent with participants’ political orientation, indirect self-reported of bias was not a significant predictor of subjective bias, $\beta = -.07$, $B = -.06$, $SE = .07$, $t = -.87$, $p = .39$, whereas when the study was consistent with their political orientation, participants who reported that their evaluations were more influenced by their pre-existing views evaluated the research more favorably, $\beta = .26$, $B = .21$, $SE = .07$, $t = 2.97$, $p < .01$ (see Table 5). The strength of the relationship (i.e., the absolute value of the coefficients) between indirect self-reported bias and subjective bias did not significantly differ between those presented with belief-consistent and belief-inconsistent evidence, $z = 1.65$, $p = .10$.

**Bias blind spot.**

*Self vs. other.* Paired samples $t$-tests were conducted to test for differences in participants’ beliefs about how strongly biased they were and others would be in evaluating each study. For the religiosity study, participants reported that, they ($M = 5.22$, $SD = 1.40$) made more of a concerted effort to remain objective than would others ($M = 4.05$, $SD = 1.53$), $t(291) = 11.38$, $p < .001$, $d = 0.67$, others ($M = 4.59$, $SD = 1.84$) would get more defensive than they did ($M = 2.28$, $SD = 1.73$), $t(291) = 17.73$, $p < .001$, $d = 1.04$, and that other people’s evaluations ($M = 5.18$, $SD = 1.31$) would be more influenced by their pre-existing views than they were themselves ($M = 4.11$, $SD = 1.86$), $t(291) = 9.96$, $p < .001$, $d = 0.60$. Likewise, for the political study, participants reported that, they ($M = 5.18$, $SD = 1.38$) made more of a concerted effort to remain objective than
would others ($M = 4.08, SD = 1.48$), $t(292) = 12.01, p < .001, d = 0.70$, others ($M = 4.46, SD = 1.68$) would get more defensive than they did ($M = 2.55, SD = 1.85$), $t(292) = 15.54, p < .001, d = 0.91$, and that other people’s evaluations ($M = 4.98, SD = 1.39$) would be more influenced by their pre-existing views than they were themselves ($M = 4.05, SD = 1.81$), $t(292) = 8.41, p < .001, d = 0.50$ (see Figure 11).

**In-group vs. out-group.** Paired samples $t$-tests also tested for differences in participants’ beliefs about how strongly biased their religious and political in-groups would be compared to their out-groups. For the religiosity study, participants reported that those with similar religious views to their own ($M = 4.58, SD = 1.46$) would make more of a concerted effort to remain objective than would those with different religious views ($M = 3.91, SD = 1.61$), $t(291) = 6.90, p < .001, d = 0.40$, would get less defensive ($M = 3.21, SD = 1.95$) than would those with different views ($M = 4.05, SD = 2.00$), $t(291) = 5.01, p < .001, d = 0.29$, and would be less influenced by their religious beliefs ($M = 4.57, SD = 1.54$) than would those with different religious views ($M = 5.04, SD = 1.46$), $t(291) = 4.64, p < .001, d = 0.27$. For the political study, participants reported that those with similar political views ($M = 4.45, SD = 1.43$) would make more of a concerted effort to remain objective than those with different views ($M = 3.74, SD = 1.63$), $t(292) = 7.40, p < .001, d = 0.44$, would get less defensive ($M = 3.19, SD = 2.00$) than would those with different views ($M = 4.02, SD = 2.06$), $t(292) = 4.70, p < .001, d = 0.27$, and would be less influenced by their political beliefs ($M = 4.57, SD = 1.50$) than would those with different political views ($M = 4.88, SD = 1.50$), $t(292) = 3.43, p = .001, d = 0.20$ (see Figure 11).

**Self vs. other vs. in-group vs. out-group vs. researcher bias.**

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7 See Supplementary Materials for relationships between self-other and in-group-out-group bias blind spots.
Differences. Repeated measures ANOVAs were performed to test for differences in expected bias among the 5 targets (self, other, in-group, out-group, researchers) for each study. These analyses were significant for both the religious, $F(4, 291) = 63.52, p < .001$, and political studies, $F(4, 292) = 50.77, p < .001$. For the religious study, participants reported that the researchers were the least biased ($M = 3.70, SD = 1.76$), followed by themselves ($M = 4.11, SD = 1.86$), their in-group, ($M = 4.57, SD = 1.54$), their out-group ($M = 5.04, SD = 1.46$), and others in general ($M = 5.18, SD = 1.31$). For the political study, participants also reported the researchers were the least biased ($M = 3.72, SD = 1.78$), followed by themselves ($M = 4.05, SD = 1.81$), their in-group, ($M = 4.57, SD = 1.50$), their out-group ($M = 4.88, SD = 1.49$), and others in general ($M = 4.98, SD = 1.39$) (see Figure 11).

There were also significant differences in expected objectivity among the targets for the religious, $F(4, 291) = 51.74, p < .001$, and political studies, $F(4, 292) = 62.58, p < .001$. For the religiosity study, participants reported that they ($M = 5.22, SD = 1.40$) made the strongest effort to remain objective, followed by the researchers ($M = 4.63, SD = 1.41$), their in-group ($M = 4.58, SD = 1.46$), other people in general ($M = 4.05, SD = 1.53$), and their out-group ($M = 3.91, SD = 1.61$). Likewise, for the political study, participants reported that they ($M = 5.18, SD = 1.38$) made the strongest effort to remain objective, followed by the researchers ($M = 4.59, SD = 1.37$), their in-group ($M = 4.45, SD = 1.43$), other people in general ($M = 4.08, SD = 1.48$), and their out-group ($M = 3.74, SD = 1.63$) (see Figure 11).

 Analyses were not performed for the defensiveness variable because this question was not asked in relation to the researchers.
**Similarities.** Although there were differences in expected bias among the 5 targets, participants also appeared to project their own biases onto the other targets. Participants’ self-assessment of bias was positively correlated with the bias expected among the other 4 targets, $r’s > .32, p’s < .001$ for both studies, with participants’ own bias most strongly correlated with the bias expected among members of their in-group, $r’s > .47$ for both studies (see Table 8). The same pattern was observed for the objectivity variable, $r’s > .17, p’s < .01$. Participants’ ratings of bias for each target for the religiosity study were also correlated with their ratings of bias for that same target for the political study, $r’s > 0.27, p’s < .001$ (see Table 8).

**Belief-consistent vs. belief-inconsistent evidence.** To examine whether participants reported greater bias and defensiveness and lower objectivity when evaluating belief-inconsistent than belief-consistent evidence, two sets of analyses were performed. A series of ANOVAs examined the effects of research findings and religious orientation on participants’ self-reported bias (indirect self-reported bias, defensiveness, and objectivity). In addition, independent t-tests compared whether, across levels of religiosity, participants reported greater bias and defensiveness and lower objectivity when presented with belief-inconsistent vs. belief-consistent evidence.

**Religiosity study.** For the indirect self-assessment of bias measure, the main effects for religious orientation, $F(1, 288) = 2.96, p = .09$, and research findings, $F(1, 288) = 3.26, p = .07$, were non-significant, but there was a significant research findings x religious orientation interaction, $F(1, 288) = 5.28, p = .02, d = 0.27$. Non-religious participants reported that their evaluations of the religion-enhancing study ($M = 4.38, SD = 1.92$) were more influenced by their pre-existing views than were their evaluations of
the religion-disparaging study ($M = 3.50$, $SD = 1.95$), $t(147) = -2.77$, $p = .006$, whereas religious participants reported that their evaluations of the religion-enhancing ($M = 4.26$, $SD = 1.61$) and religion-disparaging study ($M = 4.36$, $SD = 1.83$) were equally influenced by their pre-existing views, $t(141) = 0.37$, $p = 0.71$. Across levels of religiosity, participants reported that their evaluations of the belief-inconsistent study ($M = 4.37$, $SD = 1.87$) were more influenced by their pre-existing views than were their evaluations of the belief-consistent study ($M = 3.87$, $SD = 1.83$), $t(290) = 2.33$, $p = .02$, $d = 0.27$ (see Table 6 and Figure 5).

There were no main effects for religious orientation, $F(1, 288) = 2.55$, $p = 0.11$, or research findings, $F(1, 288) = 0.07$, $p = 0.79$, on self-reported defensiveness. However, there was a significant research findings x religious orientation interaction, $F(1, 288) = 87.08$, $p < .001$, $d = 1.09$. Non-religious participants reported greater defensiveness when presented with religion-enhancing ($M = 2.99$, $SD = 1.77$) vs. religion-disparaging findings ($M = 1.37$, $SD = 0.90$), $t(147) = -7.12$, $p < .001$, whereas religious participants reported greater defensiveness when presented with religion-disparaging ($M = 3.32$, $SD = 1.97$) vs. religion-disparaging findings ($M = 1.61$, $SD = 1.25$), $t(141) = -6.19$, $p < .001$. Across levels of religiosity, participants reported greater defensiveness when presented with belief-inconsistent ($M = 3.15$, $SD = 1.89$) vs. belief-consistent findings ($M = 1.49$, $SD = 1.09$), $t(290) = 9.33$, $p < .001$, $d = 1.08$ (see Table 6 and Figure 5).

There were no main effects for religious orientation, $F(1, 288) = 0.79$, $p = .38$, or research findings, $F(1, 288) = 1.97$, $p = .16$, on self-reported objectivity. However, there was a significant research findings x religious orientation interaction, $F(1, 288) = 5.76$, $p = .02$, $d = 0.28$. Non-religious participants reported that they made a stronger effort to
remain objective when evaluating the religion-disparaging ($M = 5.45, SD = 1.31$) vs. religion-enhancing ($M = 4.83, SD = 1.42$) study, $t(147) = 2.76$, $p = .006$, whereas religious participants reported that they exerted the same effort to remain objective when evaluating the religion-disparaging ($M = 5.20, SD = 1.44$) and religion-enhancing ($M = 5.36, SD = 1.38$) studies, $t(141) = -0.69$, $p = 0.49$. Across levels of religiosity, participants reported greater effort to remain objective when evaluating the belief-consistent ($M = 5.41, SD = 1.34$) vs. belief-inconsistent study ($M = 5.01, SD = 1.44$), $t(290) = -2.42$, $p = .02$, $d = 0.29$ (see Table 6 and Figure 5).

**Political study.** For the political study, there were no main effects of political orientation, $F(1, 288) = 0.72$, $p = .40$, or research findings, $F(1, 288) = 0.60$, $p = .44$, on indirect self-reported bias, but there was a significant research findings x political orientation interaction, $F(1, 288) = 8.64$, $p = .004$, $d = 0.35$. Conservative participants reported that their evaluations of the liberal-enhancing study ($M = 4.30, SD = 1.68$) were more influenced by their pre-existing views than were their evaluations of the conservative-enhancing study ($M = 3.46, SD = 1.82$), $t(92) = -2.31$, $p = .02$, and liberal participants tended to report that their evaluations of the conservative-enhancing study ($M = 4.32, SD = 1.82$) were more influenced by their pre-existing views than were their evaluations of the liberal-enhancing study ($M = 3.83, SD = 1.80$), $t(196) = 1.89$, $p = .06$. Across political ideology, participants reported that their evaluations of the belief-inconsistent study ($M = 4.31, SD = 1.77$) were more influenced by their pre-existing views than were their evaluations of the belief-consistent study ($M = 3.71, SD = 1.80$), $t(290) = 2.85$, $p = .005$, $d = 0.34$ (see Table 6 and Figure 5).
There were no main effects of political orientation, $F(1, 288) = 0.00, p = .95$, or research findings, $F(1, 288) = 0.11, p = .74$, on self-reported defensiveness, but there was a significant research findings x political orientation interaction, $F(1, 288) = 54.77, p < .001, d = 0.87$. Conservative participants reported greater defensiveness when presented with liberal-enhancing ($M = 3.21, SD = 1.98$) vs. conservative-enhancing ($M = 1.71, SD = 1.31$) findings, $t(92) = -4.19, p < .001$, whereas liberal participants reported greater defensiveness when presented with conservative-enhancing ($M = 3.26, SD = 1.93$) vs. liberal-enhancing findings ($M = 1.63, SD = 1.24$), $t(196) = 6.90, p < .001$. Across political ideology, participants reported that they felt more defensive when presented with belief-inconsistent ($M = 3.25, SD = 1.94$) vs. belief-consistent ($M = 1.65, SD = 1.26$) evidence, $t(290) = 8.08, p < .001, d = 0.98$ (see Table 6 and Figure 5).

There were no main effects of political orientation, $F(1, 288) = 0.47, p = .49$, or research findings, $F(1, 288) = 0.71, p = .40$, on self-reported objectivity, but there was a significant research findings x political orientation interaction, $F(1, 288) = 5.72, p = .02, d = 0.28$. Conservative participants reported greater objectivity when evaluating the conservative-enhancing ($M = 5.56, SD = 1.05$) vs. liberal-enhancing ($M = 5.00, SD = 1.27$) study, $t(92) = 2.29, p = .025$; liberal participants’ self-reports of objectivity did not significantly differ when evaluating liberal-enhancing ($M = 5.30, SD = 1.33$) vs. conservative-enhancing ($M = 5.03, SD = 1.55$) findings, $t(196) = -1.29, p = .20$. Across political ideology, participants reported greater objectivity when evaluating a belief-consistent study ($M = 5.38, SD = 1.25$) than a belief-inconsistent study ($M = 5.02, SD = 1.46$), $t(290) = -2.24, p = .03, d = 0.26$ (see Table 6 and Figure 5).

**Discounting vs. Supporting Science**
Discounting the ability of science to study the particular research question.

Religiosity study. A two-way ANOVA examined the effects of the religious study research findings and religious orientation on the extent to which participants believed the religiosity research question could not be addressed using scientific methods. The main effects for research findings, $F(1, 288) = .60, p = 0.44$, and religious orientation, $F(1, 288) = .09, p = 0.77$, were nonsignificant, but there was a significant research findings x religious orientation interaction, $F(1, 288) = 15.12, p < .001, d = 0.46$. Simple effects performed on religious orientation demonstrated the scientific impotence effect: non-religious participants were more likely to discount the ability of science to study the relationship between religiosity and psychological well-being in the religion-enhancing condition ($M = 5.06, SD = 1.99$) than in the religion-disparaging condition ($M = 3.95, SD = 2.11$), $t(147) = -3.30, p = .001$, whereas religious participants were more likely to discount the ability of science to study this topic in the religion-disparaging condition ($M = 4.94, SD = 2.05$) than in the religion-enhancing condition ($M = 4.20, SD = 1.96$), $t(141) = 2.21, p = .03$ (see Figure 6).

Likewise, across levels of religiosity, participants were more likely to agree that the question addressed by the research could not be examined using scientific methods when presented with belief-inconsistent ($M = 5.00, SD = 2.01$) vs. belief-consistent ($M = 4.07, SD = 2.03$) religiosity research findings, $t(290) = 3.92, p < .001, d = 0.46$ (see Figure 7).

Political study. A two-way ANOVA examined the effects of the political study research findings and political orientation on the extent to which participants believed the political ideology research question could not be addressed using scientific methods.
Neither the main effects for research findings, $F(1, 288) = .82, p = 0.37$, or political orientation, $F(1, 288) = 3.23, p = .07$, nor the interaction, $F(1, 288) = 2.59, p = 0.11$, were statistically significant (see Figure 12).

Comparing those who received belief-consistent and inconsistent findings across political orientation, there was also no significant difference in the extent to which participants agreed that the research question could not be examined using scientific methods, $t(290) = 1.39, p = .17$ (see Figure 7).

**Support for science in general.**

**Religiosity study.** An additional two-way ANOVA was performed to examine the effects of the religiosity study research findings and religious orientation on participants’ general support for science. The was no main effect for research findings, $F(1, 288) = .85, p = 0.36$, but there was a main effect for religious orientation, $F(1, 288) = 43.44, p < .001, d = 0.77$. Non-religious participants ($M = 5.63, SD = .73$) reported greater support for science than did religious participants ($M = 4.94, SD = 1.06$). The research findings x religious orientation interaction was nonsignificant, $F(1, 288) = 2.46, p = 0.12$.

There was also no difference in general support for science between those presented with belief-consistent vs. belief-inconsistent religiosity findings when examined across levels of religiosity, $t(290) = -1.49, p = 0.14$ (see Figure 9).

**Political study.** A two-way ANOVA also examined the effects of the political study research findings and political orientation on participants’ general support for science. There was no main effect for research findings, $F(1, 288) = .98, p = 0.32$, but there was a main effect for political orientation, $F(1, 288) = 29.55, p < .001, d = 0.64$. 
Liberals ($M = 5.50, SD = .88$) reported greater support for science than did conservatives ($M = 4.86, SD = 1.00$). The interaction was nonsignificant, $F(1, 288) = 1.93, p = 0.17$.

There was no difference in general support for science between those presented with belief-consistent vs. belief-inconsistent political research findings when examined across political orientation, $t(290) = -1.10, p = .27$ (see Figure 9).

**Both studies.** Although each study on its own had no effect on participants’ overall support for science, it is possible that the combined effect of both studies influenced how strongly participants reported supporting science at the end of the study. To test this question, participants were categorized into three groups: those for whom both studies were consistent with their beliefs, those for whom both studies were inconsistent with their beliefs, and those who received one study consistent and one inconsistent with their views. A one-way ANOVA was then conducted, examining differences in support for science among these three groups. The results of this analysis were significant, $F(2, 289) = 3.08, p < .05, d = 0.29$. Follow-up Tukey HSD tests indicated that participants presented with one belief-consistent and one belief-inconsistent study ($M = 5.20, SD = 1.05$) reported lower support for science than did those presented with two belief-consistent studies ($M = 5.54, SD = .81$). Support for science among participants presented with two belief-inconsistent studies ($M = 5.24, SD = .90$) did not significantly differ from those presented with consistent or mixed findings (see Figure 13).

**Researcher bias.**

**Attributions of religiosity study findings.** When asked how religious participants thought the researchers who conducted the study were, 25.7% of the sample reported they
didn’t know. Across conditions and religious orientation, participants rated the researchers as slightly more non-religious \((M = 3.64, SD = 1.83)\) than the midpoint of 4, \(t(216) = -2.90, p < .01\).

Using only participants who made a prediction about the researchers’ religiosity, a two-way ANOVA was conducted to examine the effects of religiosity study research findings and religious orientation on participants’ perceptions of the researchers’ religiosity. This analysis yielded a main effect for research findings, \(F(1, 213) = 135.91, p < .001, d = 1.58\). Participants who read the religion-enhancing study rated the researchers as more religious \((M = 4.74, SD = 1.43)\) than did those who read the religion-disparaging study \((M = 2.47, SD = 1.43)\). Furthermore, one-sample \(t\)-tests indicated that participants in the religion-enhancing condition rated the researchers as more religious than the midpoint for religiosity, \(t(111) = 5.48, p < .001\), and that those in the religion-disparaging condition rated the researchers as less religious than the midpoint, \(t(104) = -11.00, p < .001\).

The main effect for religious orientation, \(F(1, 213) = 1.07, p = 0.30\), and the research findings x religious orientation interaction were nonsignificant, \(F(1, 213) = 2.40, p = 0.12\).

**Religiosity study researcher bias.** To examine whether participants perceived the researchers as more biased when the religiosity study findings challenged vs. supported their views, a composite researcher bias measure was created by averaging participants’ responses to the two researcher bias items for the religiosity study (objectivity was reverse-coded so that higher scores on this measure represented greater bias; \(\alpha = 0.71\)). A two-way ANOVA tested the effects of the religiosity study research findings and
religious orientation on participants’ assessment of the researchers’ bias. This analysis yielded no significant main effect for research findings, $F(1, 288) = .09, p = 0.76$, or religious orientation, $F(1, 288) = .03, p = 0.86$, but a significant research findings x religious orientation interaction, $F(1, 288) = 10.56, p = .001, d = 0.38$. Simple effects performed on religious orientation indicated that non-religious participants believed the researchers were more biased if the study reported religion-enhancing ($M = 3.85, SD = 1.29$) rather than religion-disparaging findings ($M = 3.27, SD = 1.56$), $t(147) = -2.45, p < .02$, whereas religious participants believed the researchers were more biased if the study reported religion-disparaging ($M = 3.77, SD = 1.34$) rather than religion-enhancing results ($M = 3.29, SD = 1.31$), $t(141) = 2.15, p = .03$.

Across religious orientation, participants presented with belief-inconsistent evidence ($M = 3.81, SD = 1.31$) rated the researchers as more biased than did those presented with belief-consistent evidence ($M = 3.28, SD = 1.44$), $t(290) = 3.27, p = .001, d = 0.39$.

**Attributions of political study findings.** When asked to rate the researchers’ ideology, 24.2% of the sample reported they didn’t know. Across conditions and political orientation, participants rated the researchers as left-leaning ($M = 4.60, SD = 2.14$) from the midpoint of 4, $t(216) = 4.13, p < .001$.

Using only participants who made a prediction about the researchers’ ideology, a two-way ANOVA tested the effects of political study research findings and political orientation on participants’ perceptions of the researchers’ ideology. This analysis yielded main effects for political orientation, $F(1, 217) = 5.59, p = .02, d = 0.22$, and research findings, $F(1, 217) = 258.26, p < .001, d = 2.15$. Across conditions,
conservatives \((M = 4.87, SD = 1.83)\) rated the researchers as more liberal than did liberals \((M = 3.87, SD = 1.90)\). Overall, participants rated the researchers as more liberal when the study reported liberal-enhancing findings \((M = 5.66, SD = 1.09)\) than they did when the study reported conservative-enhancing findings \((M = 2.72, SD = 1.38)\). Furthermore, one-sample \(t\)-tests indicated that participants in the liberal-enhancing condition rated the researchers as more liberal than the midpoint for political orientation, \(t(111) = 15.62, p < .001\), and that those in the conservative-enhancing condition rated the researchers as more conservative than the midpoint, \(t(104) = -4.36, p < .001\).

The interaction between research findings and political orientation was nonsignificant, \(F(1, 217) = .84, p = 0.36\).

**Political study researcher bias.** To examine whether participants perceived the researchers as more biased when the political study findings challenged vs. supported their views, a composite researcher bias measure was created by averaging participants’ responses to the two researcher bias items for the political study (objectivity was reverse-coded so that higher scores on this measure represented greater bias; \(\alpha = 0.77\)). A two-way ANOVA then tested the effects of political study research findings and political orientation on participants’ assessment of the researchers’ bias. This analysis yielded no significant main effects for research findings, \(F(1, 288) = 1.34, p = 0.25\), or political orientation, \(F(1, 288) = .07, p = 0.79\), but a significant interaction between the two, \(F(1, 288) = 11.56, p = .001, d = 0.40\). Simple effects revealed that conservative participants believed the researchers were more biased if the study reported liberal-enhancing \((M = 3.16, SD = 1.27)\) vs. conservative-enhancing findings \((M = 3.97, SD = 1.51)\), \(t(92) = -2.78, p < .01\), whereas liberal participants believed the researchers were more biased if
the study reported conservative-enhancing ($M = 3.72, SD = 1.57$) vs. liberal-enhancing results ($M = 3.32, SD = 1.19$), $t(196) = 1.98, p = .05$.

Across political ideology, participants presented with belief-inconsistent evidence ($M = 3.80, SD = 1.55$) rated the researchers as more biased than did those presented with belief-consistent evidence ($M = 3.27, SD = 1.21$), $t(290) = 3.20, p = .002, d = 0.38$.

**Summary**

Study 3 replicated many of the findings from Study 2, using both the same research manipulation (i.e., religiosity and psychological well-being) and an additional manipulation (i.e., political ideology and analytic ability). When rating the quality of each study, participants exhibited subjective bias, evaluating research supporting their religious or political views more favorably than research challenging their beliefs. Participants’ awareness of the study purpose did not reduce their subjective bias, suggesting that people engage in motivated reasoning equally strongly regardless of whether they suspect researchers are measuring their bias or not. This finding may reflect a bias blind spot, in which participants see themselves as less susceptible to bias than others.

Overall, participants rated their evaluations of both studies as somewhat influenced by their pre-existing views but believed they were moderately objective in evaluating the evidence and felt only slightly defensive in response to it. As in Study 2, participants’ assessments of the extent to which their research evaluations were influenced by their pre-existing views tended to correspond with an actual measure of bias (i.e., the subjective bias measure), with the exception of those presented with a belief-inconsistent political study. However, the strength of correspondence between
assessments of bias and subjective bias only significantly differed between those presented with consistent and inconsistent evidence for the religiosity study, with stronger correspondence observed among those presented with belief-consistent evidence. This finding was further explored in Study 4.

In contrast to Study 2, Study 3 found differences in self-reports of bias between those presented with belief-consistent and inconsistent evidence. For both the religiosity and political study, participants reported that their evaluations were more influenced by their pre-existing views, that they felt more defensive, and that they were less objective in response to belief-inconsistent vs. belief-consistent findings.

Study 3 revealed mixed evidence regarding whether counter-attitudinal evidence leads people to discount the ability of science to provide answers to the research question under investigation. The scientific impotence effect (Munro, 2010) emerged for the religiosity study: participants were more likely to discount the ability of science to provide answers to the religiosity study research question after presented with research challenging vs. supporting their views. However, the scientific impotence effect was not observed for the political study.

Study 3 found that each study on its own had no effect on participants’ overall support for science. That is, participants did not report lower support for science after reading a study challenging vs. supporting their religious or political views (though support for science was lower overall among religious participants and conservatives than among non-religious participants and liberals). Instead, results showed a combined effect of the two studies on participants’ general support for science. Participants presented with mixed evidence (i.e., one study supporting their views and another study challenging
them) reported lower support for science than did those presented with two belief-consistent studies. Support for science among those presented with two belief-inconsistent studies did not significantly differ from those presented with two belief-consistent studies (or one consistent and one inconsistent study). It is possible that reading some studies supporting one’s beliefs and some studies challenging one’s beliefs leads an individual to lose trust in science. However, the differences in support for science among the groups were small, and thus additional evidence is needed before drawing any strong conclusions regarding the effects of multiple belief-relevant studies on overall support for science. It is unlikely that the results of two studies would have a significant, lasting impact on participants’ overall support for science. Even so, the question of whether exposure to mixed evidence leads people to lose trust in science demands further investigation, given that people are likely exposed to mixed evidence on a regular basis.

Besides discounting the ability of science to study a topic, people can discount research findings by attributing them to the researchers’ ideological views. In Study 3, participants attributed the religiosity study findings to researchers’ religiosity and the political study findings to the researchers’ political ideology. Overall, participants viewed the researchers as left-leaning and slightly non-religious, and conservatives rated the researchers as more liberal than did liberals. Even so, and in contrast to previous research (MacCoun & Peletz, 2009), participants still rated the researchers as conservative when reading the conservative-enhancing study. Participants’ religious and political views did not influence how strongly they attributed the research findings to the researchers’ religiosity and conservatism/liberalism. However, participants rated the researchers as
more biased when the results challenged vs. supported their views. In other words, irrespective of the participants’ religious and political orientation, they attributed the research findings to the researchers’ ideological views, but participants were more likely to believe that the researchers’ views biased their findings when the results challenged vs. supported their beliefs.

Study 3 replicated the standard self-other bias blind spot and showed evidence of an in-group-out-group bias blind spot, for both the religiosity and political studies. Even so, participants appeared to project their own biases onto others, expecting others (i.e., others, in-group members, out-group members, and the researchers) to be more biased if they rated themselves as more biased. Although participants exhibited a bias blind spot, this self-enhancement effect did not extend to the researchers themselves. Surprisingly, for both the religiosity and political studies, participants reported that the researchers were the least biased, among the participants themselves, others, their in-group, and their out-group. However, participants reported that they exerted the most effort to remain objective among these targets, including the researchers, perhaps acknowledging that they must work harder than the researchers to prevent their views from biasing their evaluation of the evidence.

**Study 4**

Studies 2 and 3 replicated the classic confirmation bias effect: participants rated belief-consistent evidence more favorably than belief-inconsistent evidence. Although participants demonstrated bias, rating the quality of a research study is a subjective judgment. From these findings, it remains unclear whether people exhibit motivated reasoning bias in a more absolute sense – that is, when there is an objective standard for
comparison. To test this question, Study 4 included an absolute measure of bias. Participants were presented with several studies demonstrating that religiosity is associated with positive or negative life outcomes and were asked to recall the number of studies that favored religious or non-religious individuals. In this design, absolute bias was defined as deviation from the correct response (i.e., the actual number of studies presented that favored religious or non-religious individuals). Specifically, absolute bias would emerge if those presented with belief-inconsistent findings (i.e., religious participants in the religion-disparaging condition and non-religious participants in the religion-enhancing condition) underestimated the correct number of studies and/or if those presented with belief-consistent findings (i.e., religious participants in the religion-enhancing condition and non-religious participants in the religion-disparaging condition) overestimated the correct percentage.

Including an absolute measure of bias also permitted further examination of people’s awareness of bias, enabling a test of whether self-reports of bias correspond to this alternative measure of bias. In addition, the results of Studies 2 and 3 differed with respect to whether participants presented with belief-inconsistent evidence perceived themselves as more biased than those presented with belief-consistent evidence. Including an additional measure of bias in Study 4 enabled further exploration of this discrepancy.

The results from the previous studies suggest that people are slightly to somewhat aware of the bias they exhibit when evaluating belief-relevant evidence. However, in these studies, participants assessed their bias after explicitly evaluating the research (i.e., recording their evaluations of the research). Explicitly evaluating research may prompt
conscious, analytic processing, drawing attention to bias. Alternatively, participants may simply infer their bias from the way they evaluated the study. Either way, it is unclear whether people would be aware of their bias in the absence of explicitly evaluating a study, as occurs when people read belief-relevant evidence in a real-world setting.

To examine whether explicitly evaluating research affects awareness of bias, in Study 4, participants were randomly assigned to evaluate the research before assessing their bias or assess their bias before evaluating the research. If explicitly evaluating research increases awareness of bias, then participants who evaluate the research before assessing their bias should report greater bias than those who assess their bias before evaluating the research. Furthermore, if exposure to belief-inconsistent evidence increases awareness of bias by prompting analytic processing, then those presented with belief-inconsistent evidence may report greater bias than those presented with belief-consistent evidence, even among those who assess their bias before evaluating the research.

Studies 2 and 3 found mixed evidence regarding whether exposure to belief-inconsistent (vs. belief-consistent) findings reduces trust in research on the particular topic under investigation and overall support for science. Study 4 further examined the effects of belief-relevant evidence on trust in/support for science by including behavioral support for science measures.

**Method**

**Design**
Study 4 employed a 2 (research findings: religion-enhancing vs. religion-disparaging) x 2 (religious orientation: religious vs. non-religious) x 2 (order: assessed bias first vs. evaluated study first) between-subjects design.

**Participants**

A total of 409 participants were recruited from Amazon’s Mechanical Turk.9 Participants completed the study in exchange for $0.50. Of the 409, 32 failed more than one of the manipulation checks and were excluded from the sample. The final sample contained 374 participants (146 men, 226 women, 2 transgender), ranging in age from 18 to 75 years ($M_{\text{age}} = 38.28$, $SD = 13.60$). 197 identified as non-religious and 177 identified as religious.

**Research Findings Manipulation**

Participants were presented with 5 summaries, each describing a study on religiosity and life outcomes (see Appendix A). They were told that the studies were funded by the National Science Foundation. Participants were randomly assigned to a religion-enhancing or religion-disparaging condition. In each condition, participants were presented with 5 research summaries, 4 of which varied only the direction of the findings (favoring religious or non-religious individuals) and 1 of which was identical across conditions (showing null findings).

**Manipulation Check**

Following each research summary, participants were asked a multiple choice question to assess whether they read and understood the findings from the study.

**Order Manipulation**

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9 Mechanical Turk users were only eligible to take the study if they had not participated in Studies 2 or 3.
The order in which participants assessed their bias and evaluated the research was randomized. See Figure 14 for a graphical depiction of the order manipulation (and the general procedure for this study).

**Self-assessment of bias.** The three self-assessment of bias items used in Study 3 were included in Study 4: “To what extent was your evaluation of this research influenced by your personal views on religiosity and its relationship to life outcomes?” “When reading about this research, did you make a concerted effort to evaluate the information objectively?” “When reading about this research, did you become defensive?” Items were rated on 7-point scales ranging from 1 (not at all) to 7 (completely).

**Research evaluations.**

*Absolute bias.* To assess absolute bias, participants were asked to indicate, on a 0-5 scale, “In how many studies did the results favor religious participants?” and “In how many studies the results favor non-religious participants?” They were also asked, “In what percentage of the studies you just read did the results favor religious participants?” and “In what percentage of the studies you just read did the results favor non-religious participants?” For these questions, participants selected among six answer options (0%, 20%, 40%, 60%, 80%, and 100%).

*Subjective bias.* The study evaluation questions from the previous studies (modified to describe the 5 studies as a whole) were included to measure subjective bias ($\alpha = 0.94$).
Belief. Participants were asked how they believe religiosity is related to life outcomes (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Support for Science

Attitudinal measures.

Discounting science. Participants rated the extent to which they agreed with the statement that, “The question addressed by this research (i.e., the relationship between religiosity and life outcomes) is one that cannot be answered using scientific methods” (1=strongly disagree, 8=strongly agree).

General support for science. The two items used in the previous studies to assess support for science were included here. As before, these items were averaged to create a single support for science measure (α = 0.67).

Behavioral measures.

Letter to representative. Participants were asked (1) whether or not they would like to advocate for increased funding for scientific research and (2) to sign a letter to their representative advocating for increased funding for the Social, Behavioral, and Economic Sciences Directorate of the National Science Foundation (see Appendix B).

Donation measure. Participants were then informed that the researcher would donate $1.00 on behalf of each participant, divided in whatever way the participant pleased, to the National Science Foundation and the Save the Tiger Fund. Descriptions of each organization were provided (see Appendix C). Participants were asked to indicate
how much they would like to donate to each organization. On the following screen, they were then asked why they chose to allocate their dollar in the way that they did.\textsuperscript{10}

**Demographics**

Following the behavioral measures, participants completed a demographic questionnaire, including the measure of religiosity from the previous studies.

**Suspicion check**

At the conclusion of the study, participants were asked to describe, in 1-2 sentences, what they thought was the purpose of the study. Responses were not analyzed.

**Results**

**Descriptive Statistics**

See Table 9 for descriptive statistics and Table 10 for correlations among the measures from Study 4.

**How were participants biased?**

**Subjective bias.** A three-way between-subjects ANOVA tested the effects of research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious), and order (evaluated research first vs. assessed bias first) on ratings of research quality. Order was included as a factor in this analysis because assessing bias before evaluating research could draw participants’ attention to their potential for bias and reduce the bias they exhibit. The main effects for research findings, $F(1, 366) = 1.89, p = 0.17$, and order, $F(1, 366) = 0.02, p = 0.89$, were nonsignificant, but there was a main effect for religious orientation, $F(1, 366) = 6.52, p = .01, d = 0.23$.

Overall, religious participants ($M = 4.93, SD = 1.92$) rated the research more favorably than did non-religious participants ($M = 4.43, SD = 1.88$).

\textsuperscript{10}Responses to this open-ended question were not analyzed.
Moreover, there was a significant research findings x religious orientation interaction, $F(1, 366) = 109.87, p < .001, d = 1.08$. Simple effects performed on religious orientation revealed subjective bias among both religious and non-religious participants: religious participants rated religion-enhancing research ($M = 5.92, SD = 1.37$) more favorably than religious-disparaging research ($M = 3.84, SD = 1.85$), $t(175) = -8.55, p < .001$, and non-religious participants rated religion-disparaging research ($M = 5.20, SD = 1.83$) more favorably than religion-enhancing research ($M = 3.62, SD = 1.58$), $t(195) = 6.48, p < .001$ (see Figure 3).

There were no other significant interactions, $F’s < 0.27, p’s > 0.61$, indicating that subjective bias was not reduced among those who assessed their bias before evaluating the research.

Across levels of religiosity, participants rated belief-consistent evidence ($M = 5.55, SD = 1.66$) more favorably than belief-inconsistent evidence ($M = 3.72, SD = 1.71$), $t(372) = -10.46, p < .001, d = 1.09$ (see Figure 4).

**Absolute bias.** To assess absolute bias, participants responded to a series of four items, reporting the number of studies that favored religious and non-religious individuals and the percentage of studies that favored religious and non-religious individuals. Participants were restricted to six answer options for each question (0, 1, 2, 3, 4, and 5; and 0%, 20%, 40%, 60%, 80%, and 100%, coded on the same 0-5 scale). To create an overall measure of absolute bias, responses to the two questions that were congruent with the research findings participants received were selected; that is, responses to the two “favored religious individuals” questions were used for participants in the religion-enhancing condition and responses to the “favored non-religious individuals” questions
were used for participants in the religion-disparaging condition. These two items were first averaged ($\alpha = 0.68$) and then four was subtracted from the average to create an overall measure of absolute bias (i.e., deviation from the correct response, with 0 representing no bias). Overall, participants were very accurate at recalling what the research found ($M = -0.06, SD = 0.69$).

A three-way between-subjects ANOVA was conducted to examine whether research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious), and order (evaluated research first vs. assessed bias first) affected absolute bias in recall (i.e., deviation from the correct percentage of studies that favored the group indicated by the research). If participants exhibited absolute bias, a two-way interaction between research findings and religious orientation should emerge, with religious participants in the religion-disparaging condition and non-religious participants in the religion-enhancing condition underestimating the correct percentage and religious participants in the religion-enhancing condition and non-religious participants in the religion-disparaging condition overestimating the correct percentage. Because participants may recall the findings more accurately when doing so immediately after their presentation (i.e., when evaluating the research before assessing their bias), order was included as a factor in this analysis.

There was a significant main effect for order, $F(1, 366) = 4.60, p = .03, d = 0.22$. Participants who evaluated the research first ($M = -0.13, SD = 0.69$) were slightly more likely to underestimate the number of studies that favored the group indicated by the research than were those who assessed their bias first ($M = 0.04, SD = 0.67$). All other main effects and interactions were nonsignificant, $F's < 2.08, p's \geq 0.15$ (see Figure 15).
Across levels of religiosity, there was no difference in absolute bias between those presented with belief-consistent and inconsistent evidence, \( t(372) = 1.01, p = 0.32 \) (see Figure 16).

A second absolute bias measure was created by averaging participants’ responses to the two questions that were incongruent with the research findings they received (the “favored non-religious individuals” questions for participants in the religion-enhancing condition and the “favored religious individuals” questions for participants in the religion-disparaging condition; \( \alpha = 0.74 \)). Because the correct response to these questions was 0, no constant needed to be subtracted from the mean. Overall, participants tended to correctly recall that no studies favored the other group (\( M = 0.43, SD = 0.75 \)).

A three-way ANOVA was conducted to examine the effects of research findings, religious orientation, and order on this alternative measure of absolute bias (misrecall). In this analysis, absolute bias would emerge if those presented with inconsistent evidence (i.e., religious participants in the religion-disparaging condition and non-religious participants in the religion-enhancing condition) were more likely than those presented with consistent evidence (i.e., religious participants in the religion-enhancing condition and non-religious participants in the religion-disparaging condition) to misrecall studies favoring the opposite group as shown by the research (i.e., the in-group for those presented with inconsistent evidence). This analysis produced a main effect for order, \( F(1, 366) = 4.37, p = .04, d = 0.22 \). Participants who evaluated the research first (\( M = 0.49, SD = 0.81 \)) were slightly more likely to misrecall the research showing some evidence favoring the opposite group (i.e., favoring religious participants for those in the religion-disparaging condition and non-religious participants for those in the religion-
enhancing condition) than were participants who assessed their bias first \( (M = 0.31, SD = 0.58) \). No other main effects or interactions were significant, \( F's < 2.53, p's > 0.11 \) (see Figure 15). Across levels of religiosity, there was no difference in misrecall between those presented with belief-consistent and inconsistent evidence, \( t(372) = -0.78, p = 0.44 \) (see Figure 16).

**Belief change.** Because participants’ beliefs about the relationship between religiosity and life outcomes were only measured at the end of the study, belief change could only be assumed from examining whether, across levels of religiosity, the research findings influenced participants’ beliefs reported at the end of the study.

To examine whether participants shifted their beliefs in the direction of the evidence presented, a three-way between-subjects ANOVA tested the effects of research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious), and order (evaluated research first vs. assessed bias first) on participants’ beliefs about the relationship between religiosity and life outcomes. This analysis produced main effects for religious orientation, \( F(1, 366) = 127.88, p < .001, d = 1.06, \) and research findings, \( F(1, 366) = 79.67, p < .001, d = 0.80 \). Religious participants \( (M = 6.87, SD = 2.10) \) reported believing that religiosity is more strongly associated with positive life outcomes than did non-religious participants \( (M = 4.59, SD = 2.05) \). Across levels of religiosity, however, participants in the religion-enhancing condition \( (M = 6.87, SD = 2.10) \) reported believing that religiosity is more strongly associated with positive life outcomes than did those in the religion-disparaging condition \( (M = 4.76, SD = 2.36) \), suggesting that participants shifted their beliefs in the direction of the evidence presented (see Figure 17).
There was also an interaction between religious orientation and order, $F(1, 366) = 5.53, p = .02, d = 0.20$. Among those who assessed their bias before evaluating the research, religious participants ($M = 7.03, SD = 1.97$) reported believing that religiosity is more strongly associated with positive life outcomes than did non-religious participants ($M = 4.47, SD = 2.13$), $t(176) = -8.35, p < .001$. Although religious participants ($M = 6.71, SD = 2.22$) also reported believing that religiosity is more strongly associated with positive life outcomes than did non-religious participants ($M = 4.70, SD = 1.99$) when evaluating the research before assessing their bias, $t(194) = -6.72, p < .001$, the gap between religious and non-religious participants’ beliefs was reduced. No other main effects or interactions were significant, $F$’s < 1.98, $p$’s > 0.16.

**Relationship among subjective bias, absolute bias, and beliefs.** See Supplementary Materials for the relationships among the different measures of bias.

### Awareness of Bias

**Overall ratings.** Participants reported that their evaluations of the research were somewhat influenced by their pre-existing views ($M = 3.59, SD = 2.01$), that they exerted a strong effort to remain objective when evaluating the research ($M = 5.67, SD = 1.40$), and that they felt only slightly defensive when evaluating the research ($M = 2.21, SD = 1.76$). Indirect bias was positively associated with perceived defensiveness, $r = 0.41, p < .001$, and negatively associated with perceived objectivity, $r = -0.15, p = .003$ (see Table 10).

**Correspondence with subjective measure of bias.**

Awareness of bias was also assessed by examining correspondence between indirect bias and subjective bias. The

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11 See Supplementary Materials for analyses examining correspondence of defensiveness and objectivity with subjective bias.
indirect bias measure and research consistency were entered as predictors of subjective bias in Step 1, and the research consistency x indirect bias interaction term was entered in Step 2.

If participants were aware of their bias, then greater admission that evaluations were influenced by pre-existing views should be associated with evaluating research more favorably for those presented with belief-consistent evidence but associated with evaluating research more harshly for those presented with inconsistent evidence. Mirroring the results from the ANOVA analyses, research consistency predicted subjective bias, $\beta = .49$, $B = 1.86$, $SE = .18$, $t = 10.57$, $p < .001$, such that participants rated the research more favorably when the results were consistent versus inconsistent with their religious orientation. Indirect self-reported bias was not a significant predictor of research evaluations, $\beta = .07$, $B = .06$, $SE = .04$, $t = 1.45$, $p = .15$. However, there was a significant research consistency x indirect self-reported bias interaction, $\beta = .68$, $B = .39$, $SE = .09$, $t = 4.53$, $p < .001$ (see Table 5). Simple slopes analyses indicated that, when the research was inconsistent with participants’ beliefs, those who reported that their evaluations were more strongly influenced by their pre-existing views evaluated the quality of the research more harshly, $\beta = -0.15$, $B = -0.12$, $SE = 0.06$, $t = -1.96$, $p = .052$, whereas when the research was consistent with their beliefs, participants who reported that their evaluations were more strongly influenced by their pre-existing views evaluated the research quality more favorably, $\beta = .31$, $B = .27$, $SE = .06$, $t = 4.47$, $p < .001$ (see Table 5). The strength of the relationship between indirect self-reported bias and research evaluations (i.e., the absolute value of the coefficients) did not significantly differ
between those presented with belief-consistent and belief-inconsistent evidence, \( z = -1.64, p = 0.10 \).

**Correspondence with absolute bias.** The same analytic strategy used to assess correspondence between self-assessment of bias and subjective bias was applied to examine correspondence between self-assessment of bias and absolute bias.

If participants were aware of their bias, then greater admissions that evaluations were influenced by pre-existing views should be associated with overestimating the correct percentage for those presented with belief-consistent evidence and associated with underestimating the correct percentage for those presented with inconsistent evidence. Indirect self-reported bias did not predict overall absolute bias (i.e., deviation from the correct response), \( \beta = -0.04, B = -0.02, SE = 0.02, t = -0.83, p = .41 \), nor did indirect self-reported bias interact with research consistency to predict absolute bias, \( \beta = .12, B = .02, SE = 0.04, t = 0.67, p = .50 \) (see Table 11).

On the alternative measure of absolute bias, if participants were aware of their bias, then greater admissions that evaluations were influenced by pre-existing views should be more strongly associated with misremembering studies favoring the opposite group (as shown by the research) for those presented with inconsistent vs. consistent evidence. Neither indirect self-reported bias, \( \beta = 0.02, B = 0.02, SE = 0.04, t = 0.79, p = .43 \), nor the interaction between indirect bias and research consistency, \( \beta = 0.18, B = 0.04, SE = 0.04, t = 1.05, p = .30 \), predicted the alternative measure of absolute bias (i.e., misremembering the research favoring the opposite group; see Table 11).

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\(^{12}\) See Supplementary Materials for correspondence between defensiveness and objectivity and absolute bias.
Correspondence with belief.\footnote{See Supplementary Materials for correspondence between defensiveness and objectivity and belief change.} Participants’ responses to the question asking how they believe religiosity is related to life outcomes were recoded so that higher scores indicated holding a stronger belief in the direction of what the research showed (i.e., higher scores indicated believing that religiosity is more strongly associated with positive life outcomes for those in the religion-enhancing condition but more strongly associated with negative life outcomes for those in the religion-disparaging condition).

Correspondence between self-assessment of bias and participants’ belief was then assessed following the data analytic strategy used for subjective and absolute bias. If participants were aware of their bias, then greater admission that evaluations were influenced by pre-existing views should be associated with a weaker belief in the direction of what the research showed for those presented with belief-inconsistent evidence but a stronger belief for those presented with belief-consistent evidence.

Indirect self-reported bias did not predict the strength of participants’ belief about the relationship between religiosity and life outcomes, $\beta = -0.02$, $B = -0.03$, $SE = .08$, $t = -0.37$, $p = .71$. However, research consistency predicted participants’ belief, $\beta = 0.50$, $B = 2.38$, $SE = 0.31$, $t = 7.62$, $p < .001$, and interacted with research consistency to predict participants’ belief, $\beta = 0.61$, $B = 0.45$, $SE = 0.15$, $t = 2.95$, $p = .004$ (see Table 12). Participants presented with belief-consistent evidence reported holding a stronger belief in the direction of what the research showed than did those presented with belief-inconsistent evidence. Among those presented with belief-consistent evidence, participants who reported that their evaluations were more strongly influenced by their pre-existing views reported holding a stronger belief in what the research showed, $\beta =$
0.21, B = 0.20, SE 0.09, \( t = 2.11, p < .04 \), whereas for participants presented with belief-inconsistent evidence, those who reported that their evaluations were more strongly influenced by their pre-existing views reported believing less strongly in what the research showed, \( \beta = -0.22, B = -0.25, SE = 0.12, \ t = -2.06, \ p = .04 \) (see Table 12).

**Research consistency (belief-consistent vs. belief-inconsistent) and order (assessed bias first vs. evaluated research first).** To test whether explicitly evaluating research and evaluating belief-inconsistent (vs. consistent) evidence increases awareness of bias, a series of 2 (research consistency: belief-consistent vs. inconsistent) x 2 (order: assessed bias first vs. evaluated research first) ANOVAs was performed for each self-assessment of bias measure (indirect self-reported bias, defensiveness, and objectivity). If explicitly evaluating research increases awareness of bias, then participants should report greater bias when evaluating the research before assessing their bias than when assessing their bias before evaluating the research. If simply reading belief-inconsistent evidence also prompts analytic processing, then participants should report greater bias when presented with belief-inconsistent vs. belief-consistent evidence, even among those who assessed their bias before explicitly evaluating the research.

For indirect self-reported bias, there was a main effect for research consistency, \( F(1, 370) = 13.33, \ p < .001, \ d = 0.37 \), such that participants presented with belief-inconsistent evidence \( (M = 3.91, SD = 2.08) \) reported that their evaluations were more strongly influenced by their pre-existing views than did those presented with belief-consistent evidence \( (M = 3.28, SD = 1.89) \) (see Figure 5). There was also a main effect for order, \( F(1, 370) = 29.52, \ p < .001, \ d = 0.56 \). Participants who explicitly evaluated the research first \( (M = 4.07, SD = 1.82) \) reported that their evaluations were more strongly
influenced by their pre-existing views than did those who assessed their bias first ($M = 3.05, SD = 2.07$) (see Figure 18). The interaction was nonsignificant, $F(1, 370) = 0.05, p = 0.82$.

There was no main effect of order on self-reported defensiveness, $F(1, 370) = 0.01, p = 0.93$, but there was a main effect for research consistency, $F(1, 370) = 89.34, p < .001, d = 0.98$. Participants presented with belief-inconsistent evidence ($M = 3.00, SD = 2.00$) reported feeling more defensive than did those presented with belief-consistent evidence ($M = 1.45, SD = 1.05$) (see Figure 5). The research consistency x order interaction was nonsignificant, $F(1, 370) = 0.40, p = 0.53$.

There were no main effects for research consistency, $F(1, 370) = 0.10, p = 0.76$, or order, $F(1, 370) = 0.48, p = 0.49$, on self-reported objectivity. The interaction was also nonsignificant, $F(1, 370) = 0.01, p = 0.93$.

**Discounting vs. Supporting Science**

**Discounting the ability of science to study the particular research question.** A two-way ANOVA tested whether research findings (religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious) influenced the extent to which participants agreed that the question addressed by the research could not be answered using scientific methods. This analysis produced a main effect for religious orientation, $F(1, 370) = 11.53, p = .001, d = 0.35$. Religious participants ($M = 4.68, SD = 2.01$) more strongly agreed that the research question could not be answered using scientific methods than did non-religious participants ($M = 3.97, SD = 2.15$). There was also an interaction between research findings and religious orientation, $F(1, 370) = 10.62, p = .001, d = 0.33$. Non-religious participants were marginally more likely to discount the
ability of science to provide answers to the research question when presented with religion-enhancing ($M = 4.24, SD = 2.08$) vs. religious-disparaging ($M = 3.72, SD = 2.20$) findings, $t(195) = -1.70, p = .09$, whereas religious participants were more likely to discount the ability of science to provide answers to the question when presented with religion-disparaging ($M = 5.14, SD = 2.00$) vs. religion-enhancing ($M = 4.27, SD = 1.93$) findings, $t(175) = 2.95, p = .004$ (see Figure 6).

Across levels of religiosity, participants more strongly agreed that the question could not be answered using scientific methods when presented with belief-inconsistent ($M = 4.66, SD = 2.09$) vs. belief-consistent ($M = 3.98, SD = 2.09$) findings, $t(372) = 3.13, p = .002, d = 0.33$ (see Figure 7).

**Support for science in general.**

**Attitudinal support for science.** A two-way ANOVA also tested the effects of research findings (religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious) on overall support for science. This analysis produced a main effect for religious orientation, $F(1, 370) = 36.32, p < .001, d = 0.63$. Religious participants ($M = 5.08, SD = 1.01$) reported lower overall support for science than did non-religious participants ($M = 5.66, SD = 0.85$). All other main effects and interactions were nonsignificant, $F$’s $\leq 0.87, p$’s $> 0.35$ (see Figure 8).

Across levels of religiosity, there was no difference in overall support for science between those presented with belief-consistent and belief-inconsistent findings, $t(372) = -0.83, p = .41$ (see Figure 9).
**Behavioral support for science: Donations.** Participants’ donations were examined in two ways: (1) the amount they donated to the National Science Foundation\(^\text{14}\) and (2) the amount they allocated to the NSF relative to the total amount they donated.\(^\text{15}\)

Two-way ANOVAs examined the effects of research findings (religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious) on participants’ donations to the NSF (absolute and relative). If belief-threatening evidence reduces behavioral support for science, a two-way research findings x religious orientation interaction should emerge, such that religious participants in the religion-disparaging condition donate less to the NSF than religious participants in the religion-enhancing condition, and non-religious participants in the religion-enhancing condition donate less to the NSF than non-religious participants in the religion-disparaging condition.

For the absolute amount participants donated to the NSF, there was a main effect for religious orientation, \(F(1, 370) = 7.70, p = .006, \text{d} = 0.29\), such that non-religious participants (\(M = 0.53, SD = 0.38\)) donated more to the NSF than did religious participants (\(M = 0.43, SD = 0.35\)) (see Figure 19). All other main effects and interactions were nonsignificant, \(F’s \leq 0.53, p’s > 0.46\).

For the amount participants donated to the NSF relative to their total donations, there was also a main effect for religious orientation, \(F(1, 317) = 5.34, p = .02, \text{d} = 0.26\). Again, non-religious participants (\(M = 0.61, SD = 0.34\)) allocated a greater percentage of their total donation to the NSF than did religious participants (\(M = 0.52, SD = 0.32\)) (see

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\(^{14}\) For this variable, participants who allocated $1 to both the NSF and the Save the Tiger fund were recoded as donating $0.50 to the NSF.

\(^{15}\) Participants who did not donate to either organization were coded as missing data for this variable.
Figure 19). All other main effects and interactions were nonsignificant, \( F's < 0.49, p's > 0.48 \).

Across levels of religiosity, there was no difference in participants’ absolute, \( t(372) = 0.44, p = 0.66 \), or relative, \( t(319) = 0.02, p = 0.99 \), donations to the NSF between those presented with belief-consistent and belief-inconsistent findings (see Figure 20).

**Behavioral support for science: Letter to representative.** 354 of 374 participants provided consistent responses to the questions asking (1) whether participants would like to sign the letter to advocate for increased funding to the Social, Behavioral, and Economic Directorate at the NSF and (2) to actually sign a letter to their representative advocating for increased funding (i.e., responded yes to the first question and signed the letter or responded no to the first question and did not sign the letter). Because there was some discrepancy in responses, the two items were analyzed separately.

If belief-threatening evidence reduces behavioral support for science, then (1) non-religious participants in the religion-enhancing condition should be less likely to sign the letter than non-religious participants in the religion disparaging condition, and (2) religious participants in the religion-disparaging condition should be less likely to sign the letter than religious participants in the religion-enhancing condition. Chi-square tests were performed to test these predictions.

There were no differences in non-religious participants’ responses to the forced response question, \( \chi(1, 374) = 0.51, p = 0.48 \), and whether non-religious participants actually signed the letter, \( \chi(1, 372) = 0.58, p = 0.45 \), between those in the religion-enhancing and religion-disparaging conditions (see Table 13). There were also no differences in religious participants’ responses to the forced choice question, \( \chi(1, 374) = \)
0.76, \( p = 0.41 \), and whether religious participants actually signed the letter, \( \chi(1, 372) = 0.37, p = 0.54 \), between those in the religion-enhancing and religion-disparaging conditions (see Table 13). These findings suggest that the manipulation did not impact participants’ willingness to advocate for social science research.

Chi-square tests were also performed to examine whether participants presented with belief-inconsistent evidence were less likely to advocate for increased funding for social science research than those presented with belief-consistent evidence. Both chi-squares testing for differences in responses to the forced response question, \( \chi(1, 374) = 0.49, p = 0.49 \), and whether participants actually signed the letter, \( \chi(1, 372) = 0.78, p = 0.38 \), were nonsignificant, indicating that those presented with inconsistent evidence were equally likely to advocate for increased funding for social science research at the NSF than were those presented with consistent evidence (see Table 13).

**Summary**

Study 4 found that participants’ beliefs biased their subjective evaluations of the research quality but not their recall of the research findings. In addition, although participants’ pre-existing views influenced their beliefs about the relationship between religiosity and life outcomes after reading about the research, participants still appeared to shift their beliefs in the direction of the evidence presented (i.e., across levels of religiosity, those in the religion-enhancing condition reported believing that religiosity is more strongly associated with positive life outcomes than did those in the religion-disparaging condition). In fact, given that it is rational to maintain one’s pre-existing view to some degree (Fischhoff & Beyth-Marom, 1983; Koehler, 1993; Tversky &
Kahneman, 1974), participants demonstrated rationality in this study (shifting their beliefs in response to the evidence but not completely changing their views).

Although the results suggest that, when presented with belief-relevant evidence, people may be biased in a subjective sense (i.e., in how they evaluate the quality of the evidence) but not in an absolute manner (i.e., in recalling what the research found), it is important to note that the absolute bias measure used in Study 4 may have been too easy. Participants were only presented with five research summaries, were asked to recall what the research found either right after its presentation or shortly after, and were given forced choice options from which to choose. As a result, participants were very accurate in recalling what the research found. Kahan et al. (2013) observed absolute bias in their research, but their measure was much more challenging. Belief motivations may be employed to interpret or recall evidence when the findings are more ambiguous or difficult to recall, and thus absolute bias may emerge under different conditions. This possibility was further examined in Study 5.

In previous research in which participants were presented with an evenly mixed pattern of belief-consistent and inconsistent evidence, participants either did not change their beliefs (Kuhn & Lao, 1996; Miller et al., 1993; Munro & Ditto, 1997) or became even more polarized in the direction of their initial attitude (Taber & Lodge, 2006). In the present study, participants were presented with a consistent pattern of findings and appeared to shift their beliefs in the direction of the evidence presented. People may be (quite logically) more swayed by evidence when the findings are consistent and clear. This finding was examined more closely in Study 5 by including a more sensitive test of belief change (assessing beliefs both before and after the manipulation).
In Study 4, participants again rated their evaluations of the research as somewhat influenced by their pre-existing views but reported that they exerted a strong effort to remain objective and only felt slightly defensive in response to the evidence. Participants’ assessments of the extent to which their evaluations were influenced by their pre-existing views corresponded with their subjective bias and beliefs reported at the end of the study, suggesting that they possessed some awareness of their bias. Among participants presented with belief-consistent evidence, those who believed their evaluations were more influenced by their pre-existing views rated the research more favorably and reported a stronger belief in what the research found. Among those presented with belief-inconsistent evidence, those who believed their evaluations were more influenced by their views rated the research more harshly and reported a weaker belief in what the research showed. (Evaluating research more favorably was also associated with reporting a stronger belief in what the research found in general). Absolute bias was unrelated to self-assessment of bias, possibly because there was insufficient variability on this measure to detect differences in absolute bias.

In this study, participants reported that their evaluations were more influenced by their pre-existing views and greater defensiveness when presented with belief-inconsistent vs. belief-consistent evidence. Participants who explicitly evaluated the research before assessing their bias also reported that their evaluations were more influenced by their pre-existing views than did those who assessed their bias before explicitly evaluating the research. Both explicitly evaluating research and belief-inconsistent findings may prompt analytic processing, drawing attention to bias. Alternatively, people may simply report greater bias after evaluating research and when
presented with belief-inconsistent findings, assuming they must have been biased based on the way they evaluated the research and given that they were presented with evidence challenging their views. Whether participants are actually more aware of their bias under these circumstances remains unclear.

In Study 4, participants presented with multiple belief-threatening studies pertaining to religiosity and life outcomes, compared to those presented with belief-consistent studies, were more likely to discount the ability of science to provide answers to the research topic under investigation. However, participants presented with belief-inconsistent evidence did not show lower overall support for science than did those presented with belief-consistent evidence on either the attitudinal or behavioral measures. Overall, non-religious participants reported greater trust in science’s ability to provide answers to the particular research question, stronger general support for science, and allocated a greater percentage of their dollar to the NSF than did religious participants.

Study 5

Study 5 sought to further examine the extent to which people are (1) biased (vs. unbiased) in evaluating, recalling, and maintaining (vs. changing) their belief in response to belief-relevant evidence and (2) aware of their bias under different conditions. In particular, Study 5 aimed to further explore absolute bias by increasing the difficulty of the absolute bias measure. To do so, the number of studies participants received was increased from five to ten, and when asked to recall the number of studies that favored religious and non-religious individuals, forced-choice options were not provided (instead, free response items were used). Study 5 provided a more sensitive test of belief change by measuring participants’ beliefs about the relationship between religiosity and life
outcomes both before and after participants read about the research. Participants were also asked to recall their initial belief at the end of the study to assess whether participants were aware that any belief change that occurred (or whether they perceived holding the same belief all along).

In addition, Study 5 tested the replicability of the findings from Study 3 regarding awareness of bias under different conditions (i.e., when presented with belief-inconsistent vs. consistent research and when explicitly evaluating research before assessing bias vs. vice versa). Moreover, Study 5 assessed awareness of bias more directly by including a question that explicitly asked participants how biased they were in evaluating the research.

**Method**

**Design**

Study 5 followed a 2 (research findings: religion-enhancing vs. religion-disparaging) x 2 (religious orientation: religious vs. non-religious) x 2 (order: assessed bias first vs. evaluated study first) between-subjects design.

**Participants**

A total of 435 participants were recruited from Amazon’s Mechanical Turk.\(^{16}\) Participants completed the study in exchange for $0.50. Of the 435, 31 failed more than one of the manipulation checks and were excluded from the sample. The final sample contained 404 participants (146 men, 250 women, 3 transgender), ranging in age from 18 to 72 years ($M_{age} = 36.30, SD = 13.02$). 209 identified as non-religious and 190 identified as religious.

**Materials and Procedure**

\(^{16}\) Mechanical Turk users were only eligible to take the study if they had not participated in Studies 2-4.
See Figure 14 for a graphical representation of the procedure for this study. The materials and procedure of Study 5 were identical to Study 4, with the following exceptions:

1. **Belief (T1).** Immediately after providing informed consent, participants were asked to indicate how they believe religiosity is related to life outcomes (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

2. **Research findings manipulation.** Participants were again presented with five research summaries on the same topics; however, these summaries described 10 studies in total (2 on psychological well-being, 3 on social support, 2 on vocational outcomes, 1 on personality characteristics, and 2 on cognitive completely) rather than a single study in each summary (see Appendix D). Eight of the ten studies favored religious (or non-religious) individuals, and the other two (vocational outcomes) showed no difference between religious and non-religious individuals. The research was not described as funded by the National Science Foundation in this study.

3. **Self-assessment of bias.** An additional self-assessment of bias item was included, following the presentation of the indirect, defensiveness, and objectivity questions: “To what extent were you biased in your evaluation of this research” (1=not at all, 7=completely).\(^{17}\)

4. **Absolute bias.** Participants reported how many studies they read, how many studies favored religious and non-religious individuals, and the percentage of studies that favored religious and non-religious individuals, in an open-ended, free response manner.

\(^{17}\) At the end of the study, participants were also asked, in a free-response format, why they thought they were biased or not. Responses were not analyzed.
5. **Belief (T2) and belief recall.** Along with reporting their belief after the manipulation, participants also reported how they believed religiosity was related to life outcomes at the beginning of the study (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

5. **Support for science.** The attitudinal support for science measures from the previous studies were included in Study 5, but the behavioral support for science measures from Study 4 were not.

**Results**

**Descriptive Statistics**

See Table 14 for descriptive statistics and Table 15 for correlations among measures from Study 5.

**How were participants biased?**

**Subjective bias.** A three-way between-subjects ANOVA tested the effects of research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious), and order (evaluated research first vs. assessed bias first) on ratings of research quality. There was no main effect for research findings, $F(1, 391) = 0.89, p = 0.35$, but main effects emerged for religious orientation, $F(1, 391) = 7.69, p = .006, d = 0.25$, and order, $F(1, 391) = 4.76, p = 0.03, d = 0.19$. Overall, religious participants ($M = 4.96, SD = 1.88$) rated the research more favorably than did non-religious participants ($M = 4.51, SD = 1.82$), and those who assessed their bias before evaluating the research ($M = 4.88, SD = 1.79$) rated the research more favorably than did those who evaluated the research before assessing their bias ($M = 4.57, SD = 1.92$).
Moreover, there was a significant research findings x religious orientation interaction, $F(1, 391) = 107.16, p < .001, d = 1.03$. Simple effects performed on religious orientation revealed subjective bias among both religious and non-religious participants: religious participants rated religion-enhancing research ($M = 5.88, SD = 1.59$) more favorably than religious-disparaging research ($M = 4.01, SD = 167$), $t(188) = -7.93, p < .001$, and non-religious participants rated religion-disparaging research ($M = 5.27, SD = 1.69$) more favorably than religion-enhancing research ($M = 3.74, SD = 1.63$), $t(207) = 6.61, p < .001$ (see Figure 3).

There was a marginally significant three-way interaction among research findings, religious orientation, and order, $F(1, 391) = 2.92, p < .09, d = 0.15$. Simple effects performed on order suggest that participants exhibited greater subjective bias when evaluating the research before assessing their bias, $F(1, 194) = 36.65, p < .001, d = 1.21$, than when assessing their bias before evaluating the research, $F(1, 197) = 74.14, p < .001, d = 0.86$.

Across levels of religiosity, participants rated belief-consistent evidence ($M = 5.59, SD = 1.66$) more favorably than belief-inconsistent evidence ($M = 3.91, SD = 1.65$), $t(397) = -10.17, p < .001, d = 1.02$ (see Figure 4).

**Absolute bias.** To assess absolute bias, participants responded to five items, reporting the total number of studies they read, the number of studies that favored religious and non-religious individuals, and the percentage of studies that favored religious and non-religious individuals.

**Recall.** Although ten studies were described, because similar topics were presented together in five sets of summaries (see Appendix D), many participants
interpreted the summary sets as the number of studies rather than the actual overall number of studies described. In fact, when asked to report how many studies were presented, the mean number participants reported was 7.01 (SD = 2.62), the median was 6, and the mode was 5.\(^{18}\) As a result, the number of studies participants reported that favored the group indicated by the research\(^{19}\) (i.e., the number those in the religion-enhancing condition reported favored religious individuals and the number those in the religion-disparaging condition reported favored non-religious individuals) was divided by the total number of studies they reported that they read.\(^{20}\) Because this calculated percentage was moderately strongly correlated with the overall estimated percentage participants generated,\(^{21}\) \(r(371) = 0.47, p < .001,\) the calculated and generated percentages were combined into a single composite measure. These two items were first averaged (\(\alpha = 0.63\)) and then eighty was subtracted from the average to create an overall measure of absolute bias in recall (i.e., deviation from the correct response, with 0 representing no bias). Because the reliability of this composite measure was lower than ideal, all analyses containing this measure were also conducted separately for the calculated and generated percentages (and are available in the Supplementary Materials). Participants were fairly accurate at recalling what the research found \((M = 4.13, SD = 12.60; \text{Median} = 4.17; \text{Mode} = 20, \text{and the second most common response was 0}).\) Even so, there was greater variability in responses in Study 5 than in Study 4.

\(^{18}\) Some participants provided a range rather than a single number (e.g., 4-5 or 8-10). When this occurred, the average of the two numbers they provided was used as their response (even though studies only occur in whole numbers). Some responses could not be coded (e.g., “all of them”).

\(^{19}\) Where possible, responses such as “all of them” or “all but two” were calculated using the response participants gave to the total number of studies they read.

\(^{20}\) Five participants reported numbers of studies favoring religious and non-religious individuals that exceeded the total number of studies they reported reading and thus were excluded from analyses containing this variable.

\(^{21}\) Seven participants also reported percentages of studies favoring religious and non-religious individuals that exceeded 100 and were excluded from analyses containing this variable.
A three-way between-subjects ANOVA was conducted to examine whether research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious), and order (evaluated research first vs. assessed bias first) affected absolute bias in recall (i.e., deviation from the correct percentage of studies that favored the group indicated by the research). If participants exhibited absolute bias, a two-way interaction between research findings and religious orientation should emerge, with religious participants in the religion-disparaging condition and non-religious participants in the religion-enhancing condition underestimating the correct percentage and religious participants in the religion-enhancing condition and non-religious participants in the religion-disparaging condition overestimating the correct percentage. Because participants may recall the findings more accurately when doing so immediately after their presentation (i.e., when evaluating the research before assessing their bias), order was included as a factor in this analysis.

All main effects and interactions were nonsignificant, $F$'s $\leq 2.75$, $p$'s $> 0.09$ (see Figure 15). Across levels of religiosity, there was no difference in absolute bias between those presented with belief-consistent and belief-inconsistent evidence, $t(368) = -0.70$, $p = 0.48$ (see Figure 16).

**Misrecall.** An additional absolute bias measure was created by examining participants’ responses to the questions that were incongruent with the research findings they received (the “favored non-religious individuals” questions for participants in the religion-enhancing condition and “favored religious individuals” questions for participants in the religion-disparaging condition). As before, a percentage was calculated by dividing the number of studies participants incorrectly reported favored the opposite
group (than what the research showed) by the total number of studies they reported they read. Because this calculated percentage\textsuperscript{11} was moderately strongly correlated with the percentage participants generated,\textsuperscript{12} $r(371) = 0.47, p < .001$, the calculated and generated percentages were combined into a single composite measure of absolute bias in misrecall ($\alpha = 0.63$). Because the correct response to these questions was 0, no constant needed to be subtracted from the mean. As with the absolute bias recall composite, the reliability of the misrecall composite measure was lower than ideal, and thus all analyses were also conducted separately for the calculated and generated percentages (and are available in the Supplementary Materials). Overall, participants tended to correctly recall that few to no studies favored the other group ($M = 5.26, SD = 11.21; Median = 0; Mode = 0$).

A three-way ANOVA was conducted to examine the effects of research findings, religious orientation, and order on this alternative measure of absolute bias (misrecall). In this analysis, absolute bias would emerge if those presented with inconsistent evidence (i.e., religious participants in the religion-disparaging condition and non-religious participants in the religion-enhancing condition) were more likely than those presented with consistent evidence (i.e., religious participants in the religion-enhancing condition and non-religious participants in the religion-disparaging condition) to misrecall studies favoring the opposite group as shown by the research (i.e., the in-group for those presented with inconsistent evidence). This analysis produced a main effect for research findings, $F(1, 362) = 4.56, p = .03, \eta^2 = 0.022$. Participants in the religion-disparaging condition misrecalled a greater percentage of studies favoring religious individuals ($M = 6.39, SD = 13.58$) than those in the religion-enhancing condition misrecalled favoring
non-religious individuals ($M = 4.01, SD = 7.94$). All other main effects and interactions were nonsignificant, $F$’s < 2.77, $p$’s > 0.09 (see Figure 15).

Across levels of religiosity, there was no difference in misrecall between those presented with belief-consistent and inconsistent evidence, $t(368) = 1.04, p = 0.30$ (see Figure 16).

**Belief change.** A mixed-model ANOVA compared participants’ beliefs before the manipulation (T1), after the manipulation (T2), and perceived belief at T1 after the manipulation. In this analysis, research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious), and order (evaluated research first vs. assessed bias first) were included as between-subjects factors and time of belief assessment (pre-manipulation, post-manipulation, and post-manipulation perceived belief at T1) was included as a within-subjects factor. Belief change would be demonstrated by a two-way interaction between research findings and time of belief assessment, such that, across levels of religiosity, those in the religion-enhancing condition report believing that religiosity is more strongly associated with positive outcomes at T2 than at T1, whereas those in the religion-disparaging condition report believing that religiosity is less strongly associated with positively outcomes at T2 than at T1. Order was included as a factor in the analysis in case the delay between the manipulation and reporting one’s belief affected belief change. In addition, participants’ perceived belief at T1 (reported after the manipulation) was compared to their beliefs at T1 and T2 to assess whether participants perceived or were aware of any shifts in their beliefs.
This analysis produced a main effect for religious orientation, $F(1, 391) = 280.04, p < .001, d = 1.39$. Overall, religious participants ($M = 7.09$) reported believing that religiosity is more strongly associated with positive life outcomes than did non-religious participants ($M = 4.76$). There was also a main effect for research findings, $F(1, 391) = 14.30, p < .001, d = 0.20$, but this effect was qualified by a significant interaction between research findings and time of belief assessment (linear: $F(1, 391) = 10.57, p = .001, d = 0.07$; quadratic: $F(1, 391) = 89.06, p < .001, d = 0.34$). Simple effects performed on research findings revealed significant quadratic effects among those in the religion-enhancing, $F(1, 199) = 38.69, p < .001$, and religion-disparaging conditions, $F(1, 198) = 52.21, p < .001$. Participants in the religion-enhancing condition reported believing that religiosity is more strongly associated with positive life outcomes at T2 ($M = 6.52, SD = 1.96$) than at T1 ($M = 5.89, SD = 1.97$), and correctly recalled that they believed religiosity was less strongly associated with positive outcomes at T1 ($M = 6.00, SD = 1.94$; see Figure 17). Similarly, participants in the religion-disparaging condition reported believing that religiosity is less strongly associated with positive outcomes at T2 ($M = 5.01, SD = 2.29$) than at T1 ($M = 6.01, SD = 1.89$), and correctly recalled that they believed religiosity was more strongly associated with positive outcomes at T1 ($M = 5.78, SD = 1.90$; see Figure 17).

To assess belief change across levels of religiosity, responses to the question asking how religiosity is related to life outcomes (at T1 and T2) were first recoded for those in the religion-disparaging condition so that higher scores indicated holding a stronger belief in the direction of what the research showed (i.e., higher scores indicated believing that religiosity is more strongly associated with positive life outcomes for those
in the religion-enhancing condition but more strongly associated with negative life outcomes for those in the religion-disparaging condition. This recoded measure of beliefs at T1 was then subtracted from the recoded measure of T2 beliefs to create a measure of belief change (higher scores indicated greater belief change in the direction of what the research found). There was no difference in belief change between those presented with belief-consistent and belief-inconsistent evidence, \( t(397) = 0.38, p = 0.71 \).

**Relationship among subjective bias, absolute bias, and belief change.** See Supplementary Materials for the relationships among the different measures of bias.

**Awareness of Bias**

**Overall ratings.** Participants rated their evaluations of the research as more influenced by their pre-existing views (\( M = 3.47, SD = 1.93 \)) than they rated themselves as biased when evaluating the research (\( M = 2.78, SD = 1.67 \)), \( t(399) = 7.57, p < .001, d = 0.38 \). However, participants’ responses to the indirect and direct measures of bias were strongly correlated, \( r(400) = 0.50, p < .001 \). Participants also reported that they exerted a strong effort to remain objective when evaluating the research (\( M = 5.88, SD = 1.21 \)), and that they felt only slightly defensive when evaluating the research (\( M = 2.12, SD = 1.63 \)). Perceptions that evaluations were “influenced by pre-existing views” and “biased” were positively correlated with perceived defensiveness and negatively correlated with perceived objectivity (see Table 15).

**Correspondence with subjective measure of bias.**\(^{22}\) Awareness of bias was also assessed by examining correspondence between indirect and direct bias and subjective bias. The self-assessment of bias measure and research consistency were entered as

\(^{22}\) See Supplementary Materials for correspondence between defensiveness and objectivity and subjective bias.
predictors of subjective bias in Step 1, and a research consistency x self-assessment of bias interaction term was entered in Step 2.

If participants were aware of their bias, then greater admissions that “evaluations were influenced by pre-existing views” should be associated with evaluating belief-consistent evidence more favorably and associated with evaluating belief-inconsistent evidence more harshly. Research consistency predicted subjective bias, $\beta = 0.46, B = 1.71, SE = 0.17, t = 10.28, p < .001$, such that participants rated the research more favorably when the results were consistent versus inconsistent with their religious orientation. Indirect self-reported bias was not a significant predictor of research evaluations, $\beta = 0.07, B = 0.07, SE = 0.04, t = 1.54, p = .13$. However, there was a significant research consistency x indirect self-reported bias interaction, $\beta = 0.45, B = 0.24, SE = 0.09, t = 2.86, p = .005$ (see Table 5). Simple slopes analyses indicated that, when the research was inconsistent with participants’ beliefs, indirect self-reported bias was unrelated to subjective bias, $\beta = -0.07, B = -0.06, SE = 0.06, t = -0.94, p = .35$, whereas when the research was consistent with their beliefs, reporting that evaluations were more strongly influenced by pre-existing views was associated with evaluating the quality of the research more favorably, $\beta = 0.22, B = 0.19, SE = 0.06, t = 3.12, p = .002$ (see Table 5). The strength of the relationship between indirect self-reported bias and research evaluations (i.e., the absolute value of the coefficients) did not significantly differ between those presented with belief-consistent and belief-inconsistent evidence, $z = 1.51$, $p = 0.13$.

In addition, if participants were aware of their bias, then greater explicit admissions of “bias” should be associated with evaluating belief-consistent evidence
more favorably and associated with evaluating belief-inconsistent evidence more harshly. Direct self-reported bias was associated with subjective bias, $\beta = -0.10$, $B = -0.11$, $SE = 0.05$, $t = -2.13$, $p = .03$. However, this effect was qualified by an interaction between direct bias and research consistency, $\beta = 0.32$, $B = 0.22$, $SE = 0.10$, $t = 2.15$, $p = .03$ (see Table 5). Among those presented with belief-inconsistent evidence, greater self-reported bias was associated with evaluating the research more harshly, $\beta = -0.22$, $B = -0.21$, $SE = 0.07$, $t = -3.09$, $p = .002$, whereas self-reported bias was unrelated to subjective bias for those presented with belief-consistent evidence, $\beta = -0.01$, $B = 0.01$, $SE = 0.07$, $t = 0.10$, $p = .92$ (see Table 5). Testing the difference in strength of these relationships (i.e., by comparing the absolute value of the coefficients) revealed that the relationship between direct self-reported bias and research evaluations was stronger for those presented with belief-inconsistent vs. belief-consistent evidence, $z = 2.12$, $p = 0.03$.

**Correspondence with absolute bias.** The same analytic strategy used to assess correspondence between self-assessment of bias and subjective bias was applied to examine correspondence between self-assessment of bias and absolute bias.

If participants were aware of their bias, then greater admissions that evaluations were “influenced by pre-existing views” and greater admissions of explicit “bias” should be associated with overestimating the correct percentage for those presented with belief-consistent evidence and associated with underestimating the correct percentage for those presented with inconsistent evidence. On the alternative measure of absolute bias, if participants were aware of their bias, then greater admissions that evaluations were influenced by pre-existing views and greater admissions of bias should be more strongly associated with misrecalling studies favoring the opposite group (as shown by the
research) for those presented with inconsistent vs. consistent evidence. Neither indirect bias, direct bias, nor their interactions with research consistency, predicted either measure of absolute bias, $t$’s < 1.57, $p$’s > 0.11 (see Table 11).

**Correspondence with belief change.** Correspondence between the self-assessment of bias measures and belief change was assessed following the data analytic strategy used for subjective and absolute bias. As previously stated, on the measure of belief change, higher scores indicated greater belief change in the direction of what the research showed.

If participants were aware of their bias, then greater admission that evaluations were influenced by pre-existing views should be associated with less belief change for those presented with belief-inconsistent vs. consistent evidence. Indirect self-reported bias was unrelated to belief change, $\beta = 0.05$, $B = -0.04$, $SE = 0.04$, $t = 0.89$, and research consistency did not interact with indirect bias to predict belief change, $\beta = -0.27$, $B = -0.13$, $SE = 0.09$, $t = -1.51$, $p = .13$ (see Table 12).

If participants were aware of their bias, then greater admissions of bias should be associated with less belief change for those presented with belief-inconsistent vs. consistent evidence. Direct self-reported bias was unrelated belief change, $\beta = -0.04$, $B = -0.04$, $SE = .05$, $t = -0.85$, $p = .40$, but there was a marginally significant interaction between research consistency and direct bias, $\beta = -0.22$, $B = -0.19$, $SE = 0.10$, $t = -1.91$, $p = .057$. Among those presented with belief-inconsistent evidence, direct bias was unrelated to belief change, $\beta = 0.05$, $B = 0.05$, $SE = .08$, $t = 0.63$, $p = .53$. However, among those presented with belief-consistent evidence, greater self-reported bias was
associated with less belief change, $\beta = -0.15$, $B = -0.15$, $SE = .087$, $t = -2.19$, $p = .53$ (see Table 12).

**Research consistency (belief-consistent vs. belief-inconsistent) and order (assessed bias first vs. evaluated research first).** To test whether explicitly evaluating research and evaluating belief-inconsistent (vs. consistent) evidence increases awareness of bias, a series of 2 (research consistency: belief-consistent vs. inconsistent) x 2 (order: assessed bias first vs. evaluated research first) ANOVAs was performed for each self-assessment of bias measure (indirect self-reported bias, direct bias, defensiveness, and objectivity). If explicitly evaluating research increases awareness of bias, then participants should report greater bias when evaluating the research before assessing their bias than when assessing their bias before evaluating the research. However, if simply reading belief-inconsistent evidence also prompts analytic processing, then participants should report greater bias when presented with belief-inconsistent vs. belief-consistent evidence, even among those who assessed their bias before explicitly evaluating the research.

For indirect self-reported bias, there was a main effect for research consistency, $F(1, 395) = 4.02$, $p < .05$, $d = 0.19$, such that participants presented with belief-inconsistent evidence ($M = 3.64$, $SD = 1.92$) reported that their evaluations were more strongly influenced by their pre-existing views than did those presented with belief-consistent evidence ($M = 3.29$, $SD = 1.93$; see Figure 5). There was also a main effect for order, $F(1, 395) = 34.79$, $p < .001$, $d = 0.59$. Participants who explicitly evaluated the research first ($M = 4.00$, $SD = 1.75$) reported that their evaluations were more strongly influenced by their pre-existing views than did those who assessed their bias first ($M = \ldots$)
2.92, \( SD = 1.96 \); see Figure 18). The interaction was nonsignificant, \( F(1, 395) = 1.24, p = 0.27 \).

There was also a main effect of research consistency for direct self-reported bias, \( F(1, 395) = 9.92, p = .002, d = 0.31 \), such that participants presented with belief-inconsistent evidence \( (M = 3.04, SD = 1.71) \) reported that their evaluations were more biased than did those presented with belief-consistent evidence \( (M = 2.54, SD = 1.60; \) see Figure 5). In addition, there was a main effect for order, \( F(1, 395) = 9.03, p = .003, d = 0.30 \). Participants who explicitly evaluated the research first \( (M = 3.02, SD = 1.62) \) reported that their evaluations were more biased than did those who assessed their bias first \( (M = 2.55, SD = 1.69; \) see Figure 18). The interaction was nonsignificant, \( F(1, 395) = 0.08, p = 0.78 \).

There was no main effect of order on self-reported defensiveness, \( F(1, 395) = 2.17, p = 0.14 \), but there was a main effect for research consistency, \( F(1, 395) = 47.21, p < .001, d = 0.69 \). Participants presented with belief-inconsistent evidence \( (M = 2.66, SD = 1.76) \) reported feeling more defensive than did those presented with belief-consistent evidence \( (M = 1.60, SD = 1.30; \) see Figure 5). The research consistency x order interaction was nonsignificant, \( F(1, 395) = 0.15, p = 0.70 \).

For self-reported objectivity, there was a main effect for research consistency, \( F(1, 395) = 4.66, p = .03, d = 0.22 \), such that participants presented with belief-consistent evidence \( (M = 6.10, SD = 0.98) \) reported that they exerted slightly more effort to remain objective than did those presented with belief-inconsistent evidence \( (M = 5.75, SD = 1.24; \) see Figure 5). There was no main effect for order, \( F(1, 395) = 0.60, p = 0.44 \), but there was a research consistency x order interaction, \( F(1, 395) = 5.14, p = .02, d = 0.23 \).
Among participants who assessed their bias before evaluating the research, there was no difference in self-reported objectivity between those presented with belief-consistent and belief-inconsistent evidence, $t(196) = 0.07, p = 0.94$. However, among those who evaluated the research before assessing their bias, participants presented with belief-inconsistent evidence ($M = 5.57, SD = 1.27$) reported less objectivity than did those presented with belief-consistent evidence ($M = 6.10, SD = 0.98$), $t(199) = -3.33, p = .001$.

Discounting vs. Supporting Science

**Discounting the ability of science to study the particular research question.** A two-way ANOVA examined the effects of research findings (religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious) on the extent to which participants agreed that the question addressed by the research could not be answered using scientific methods. This analysis produced a marginally significant main effect for religious orientation, $F(1, 395) = 3.72, p = .054, d = 0.19$. Religious participants ($M = 4.52, SD = 2.13$) were slightly more likely to agree that the question could not be answered using scientific methods than were non-religious participants ($M = 4.12, SD = 2.13$). There was also an interaction between research findings and religious orientation, $F(1, 395) = 22.45, p < .001, d = 0.47$. Demonstrating the scientific impotence effect, non-religious participants were more likely to discount the ability of science to provide answers to the research question when presented with religion-enhancing ($M = 4.50, SD = 2.07$) vs. religious-disparaging ($M = 3.74, SD = 2.13$) findings, $t(207) = -2.61, p = .01$, whereas religious participants were more likely to discount the ability of science to provide answers to the question when presented with religion-disparaging ($M = 3.92, SD$
= 2.10) vs. religion-enhancing ($M = 5.13, SD = 1.99$) findings, $t(188) = 4.09, p < .001$
(see Figure 6).

Across levels of religiosity, participants more strongly agreed that the question
could not be answered using scientific methods when presented with belief-inconsistent
($M = 4.80, SD = 2.05$) vs. belief-consistent ($M = 3.83, SD = 2.11$) evidence, $t(397) =
4.67, p < .001, d = 0.47$ (see Figure 7).

**Support for science in general.** A two-way ANOVA tested the effects of
research findings (religion-enhancing vs. religion-disparaging) and religious orientation
(religious vs. non-religious) on overall support for science. This analysis produced a main
effect for religious orientation, $F(1, 395) = 11.99, p = .001, d = 0.35$. Religious
participants ($M = 5.27, SD = 1.03$) reported lower overall support for science than did
non-religious participants ($M = 5.59, SD = 0.85$). There was also a significant interaction
between religious orientation and research consistency, $F(1, 395) = 5.46, p = .02, d =
0.23$. Non-religious participants reported marginally lower support for science in the
religion-enhancing ($M = 5.48, SD = 0.85$) vs. religion-disparaging condition ($M = 5.70,
SD = 0.83$), $t(207) = 1.92, p = .056$. The difference in support for science between
religious participants in the religion-enhancing ($M = 5.38, SD = 0.99$) and religion-
disparaging ($M = 5.16, SD = 1.07$) condition was nonsignificant, $t(188) = -1.44, p = 0.15$
(see Figure 8).

Across levels of religiosity, participants presented with belief-inconsistent
findings ($M = 5.33, SD = 0.97$) reported slightly less overall support for science than did
those presented with belief-consistent findings ($M = 5.55, SD = 0.93$), $t(397) = -2.30, p =
.02, d = 0.23$ (see Figure 9).
Summary

The previous studies (and the motivated reasoning literature in general) repeatedly demonstrate that people exhibit bias when evaluating the subjective quality of belief-relevant evidence. One of the primary goals of Study 5 was to further examine the extent to which people are biased in a more absolute manner—when recalling research findings and in maintaining (vs. changing) one’s beliefs in response to evidence.

Because the absolute bias measure in Study 4 may have been too easy to detect absolute bias, a more difficult measure was employed in Study 5. The number of studies presented was doubled, and participants were not given answer options to choose among when asked how many studies and the percentage of studies that favored religious and non-religious individuals. These changes were successful in increasing the difficulty of the measure, as indicated by increased variability in responses.

Despite the increased difficulty of the absolute bias measure, participants did not exhibit bias in recalling what the research showed. That is, participants’ religious views did not bias the way they recalled research findings that were consistent or inconsistent with their beliefs. Furthermore, only one of the measures of absolute bias was weakly associated with subjective bias, and neither measure was significantly related to belief change (see Supplementary Materials). Although these measures clearly assess bias in different forms, one would expect that they would be related, to some degree. Indeed, subjective bias was associated with belief change (i.e., evaluating research more favorably was associated with shifting beliefs in the direction of the evidence presented). Therefore, it is unclear whether absolute bias was not observed because people are in fact
unbiased in recalling belief-relevant findings, or whether the absolute bias measure failed to capture absolute bias.

Using a more sensitive test of belief change (i.e., assessing participants’ beliefs about the relationship between religiosity and life outcomes before and after the manipulation), Study 5 replicated the findings from Study 4. Although participants’ beliefs about the relationship between religiosity and life outcomes were influenced by their pre-existing views, they still shifted their beliefs in the direction of the evidence presented. Again, neither belief perseverance nor attitude polarization was observed in this study. This finding suggests that people demonstrate some degree of rationality, updating their views following the presentation of clear, consistent evidence but retaining their beliefs in response to mixed results (Miller et al., 1993; Munro & Ditto, 1997; though some studies have found that people adopt even more polarized positions in response to mixed evidence, e.g., Taber & Lodge, 2006). Additionally, participants not only shifted their beliefs in the direction of the evidence presented but accurately recalled their beliefs at the beginning of the study. In other words, participants did not appear to believe they held the same belief all along even though the research had changed their beliefs; rather, they knew they held a different belief at the beginning of the study and changed their views after reading about the research. People appear to respond quite differently to clear, consistent results than they do to mixed findings, in that previous studies exposing participants to mixed evidence have repeatedly shown that people believe they adopted more polarized positions in the direction of their initial beliefs (Kuhn & Lao, 1996; Miller et al., 1993; Munro & Ditto, 1997).
A secondary goal of Study 5 was to further explore awareness of bias by explicitly asking participants how biased they believed they were when evaluating the evidence. Interestingly, participants were more willing to report that their evaluations of the research were influenced by their pre-existing views (indirect bias) than they were to admit that they were biased (direct bias). The difference in responses to these two questions may reflect a social desirability bias, in that participants prefer not to think of themselves as biased. The indirect bias measure was associated with subjective bias among those presented with belief-consistent evidence (but not significantly for those presented with belief-inconsistent evidence), whereas the direct bias measure was associated with subjective bias for those presented with belief-inconsistent evidence (but not belief-consistent evidence). Because neither the indirect or direct measures of bias showed strong correspondence with this measure of actual bias, it is unclear whether these differences in correspondence are meaningful or simply reflect the fact that people are, at best, only slightly aware of their bias. These different patterns of correspondence between subjective bias and indirect and direct bias were further examined in Study 6.

Study 5 replicated the finding from Study 4 in which participants reported greater bias when explicitly evaluating the research before assessing their bias (vs. vice versa), for both the indirect and direct self-report measures of bias. In Study 5, participants also reported greater bias (indirect, direct, defensiveness, and lower objectivity) when presented with belief-inconsistent vs. belief-consistent evidence. Although explicitly evaluating research and reading belief-inconsistent evidence repeatedly increased reports of bias, it remains unclear whether explicitly evaluating research and evaluating belief-
inconsistent evidence increases awareness of bias or simply prompts people to report greater bias.

Study 5 also largely replicated the findings from the previous studies regarding the effects of belief-relevant evidence on overall support for science. Belief-inconsistent (vs. consistent) evidence more strongly influenced participants’ views about whether science can provide answers to the particular topic under investigation than it reduced overall support for science. Study 5 did show that participants presented with belief-inconsistent evidence reported lower support for science than those presented with belief-consistent evidence, but the difference was small.

**Study 6**

The purpose of Study 6 was to more closely examine many of the findings from Study 5. Study 6 tested the replicability of the absence of absolute bias (i.e., that participants’ beliefs did not bias their recall of the research findings) and the patterns of belief change observed in Study 5 (i.e., that participants’ shifted their beliefs in the direction of the evidence presented and accurately recalled their initial belief). Study 6 also further investigated differences in self-reports of bias based on question wording (i.e., whether or not the word “bias” was explicitly stated), along with patterns of correspondence between subjective bias and the indirect and direct self-report measures of bias.

These different patterns of responding to the indirect and the direct self-report measures of bias raise the question of what people think it means to be biased. To explore this question, Study 6 included two additional self-assessment of bias measures, intended to assess awareness of the affective and cognitive processes that define biased
information processing. Process models of motivated reasoning (e.g., Munro & Ditto, 1997; Klaczynski, 2000) suggest that people adopt more skepticism and exert more effort critiquing belief-inconsistent vs. belief-consistent evidence. If people are aware of the processes that define biased information processing, then participants should report greater skepticism and effort critiquing belief-inconsistent vs. consistent research, and these measures should correspond to self-reports of bias and measures of actual bias.

Finally, Study 6 further examined how evaluating research affects awareness of bias. Although participants reported greater bias when explicitly evaluating the research before assessing their bias (vs. vice versa), people likely begin evaluating research as they read it (i.e., forming a judgment of it). To determine whether evaluating research, even if not done explicitly, affects awareness of bias, in Study 6, participants predicted how biased they would be before they were informed of the outcome of the research. Presumably, little to no evaluating would occur before learning the outcome to the research, as people would not yet know whether the evidence favors their group or not.

If evaluating research the way people tend to evaluate research (i.e., automatically as they read it, rather than recording evaluations of it) draws some attention to bias, then among those who assess their bias before explicitly evaluating the research, participants should report greater bias after learning the outcome to the research vs. before. Because people may engage in more analytic, evaluative processing when presented with belief-inconsistent vs. belief-consistent evidence (beginning to counterargue the research as they read it), learning the outcome to research (before explicitly evaluating it) may only increase awareness of bias among those presented with belief-inconsistent evidence.
By having participants report their expected bias before the manipulation and perceived bias after the manipulation, this design also enabled a test of whether people can reliably predict how biased they subsequently were (and thought they were).

**Method**

**Design**

Study 6 followed a 2 (research findings: religion-enhancing vs. religion-disparaging) x 2 (religious orientation: religious vs. non-religious) x 2 (post-manipulation order: assessed bias first vs. evaluated study first) x 2 (time of bias assessment: pre vs. post manipulation) mixed model design, with research findings, religious orientation, and order as between-subjects factors and time of bias assessment as a within-subjects factor.

**Participants**

A total of 417 participants were recruited from Amazon’s Mechanical Turk. 23 Mechanical Turk users were only eligible to take the study if they had not participated in Studies 2-5.

Participants completed the study in exchange for $0.50. Of the 417, 28 failed more than one of the manipulation checks and were excluded from the sample. The final sample included 389 participants (138 men, 242 women, 9 unreported), ranging in age from 18 to 71 years ($M_{\text{age}} = 36.47, SD = 12.21$). 178 identified as non-religious and 202 identified as religious (9 failed to report their religious orientation).

**Materials and Procedure**

See Figure 21 for a graphical representation of the procedure from Study 6.

**Belief (T1).** After providing informed consent, participants first indicated how they believe religiosity is related to life outcomes (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

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23 Mechanical Turk users were only eligible to take the study if they had not participated in Studies 2-5.
Pre-assessment of bias. After reporting their belief, participants were informed: “In this survey, you will read about several studies that examined whether religiosity is associated with positive or negative life outcomes.” Then were then asked to rate, on a scale from 1 (not at all) to 7 (completely), “To what extent do you think your evaluation of the quality of this research will be influenced by your pre-existing views” (indirect bias T1) and “How biased do you think you will be in evaluating the quality of this research?” (direct bias T1).

Following the indirect and direct bias measures, participants were asked how much effort they think they will exert critiquing studies that conflict with and support their views on religiosity and life outcomes (1=no effort, 7=strong effort), how defensive they think studies that conflict with and support their views on religiosity and life outcomes will make them feel (1=not at all, 7=extremely), and how skeptical they think they will be of studies that conflict with and support their views (1=not at all, 7=extremely). The order in which participants were presented with the “conflict with” and “support” questions was randomized.

Research findings manipulation. Participants were then presented with the same research summaries from Study 5, describing ten studies on religiosity and life outcomes (see Appendix D). Participants completed corresponding manipulation check questions for each summary.

Post manipulation order. The order in which participants assessed their bias and evaluated the research was randomized.

Research evaluations.
Absolute bias. As in Study 5, participants were asked, in a free-response format, how many studies they read, how many studies favored religious and non-religious individuals, and what percentage of studies favored religious and non-religious individuals.

Belief (T2). After the manipulation, participants again indicated how they believe religiosity is related to life outcomes (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Subjective bias. Participants completed the four research evaluation questions as in the prior studies (α = 0.94).

Discounting science. Participants rated their level of agreement with the statement that the question addressed by the research could not be answered using scientific methods (1=strongly disagree, 8=strongly agree).

Post-assessment of bias. After the manipulation, participants rated, “To what extent was your evaluation of the quality of the research influenced by your pre-existing views on religiosity and life outcomes” (indirect bias T2) and “How biased were you in evaluating the quality of the research?” (direct bias T2) on a scale from 1 (not at all) to 7 (completely).

Participants then rated, “How much effort did you exert critiquing the studies?” (1= no effort, 7=strong effort), “How skeptical were you of the studies?” (1=not at all, 7=extremely), and “How defensive did the studies make you feel?” (1=not at all, 7=extremely).

Belief recall. After assessing their bias and evaluating the research, participants were asked to recall how they believed religiosity was related to life outcomes before
reading about the research (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

**General support for science.** At the end of the study, participants reported their general trust in and support for scientific research (α = 0.75).

**Demographics.** Participants completed a demographic questionnaire, including the measure of religiosity from the previous studies.

**Suspicion check.** At the conclusion of the study, participants were asked to describe why they thought they were biased or not and what they thought was the purpose of the study. Responses were not analyzed.

**Results**

**Descriptive Statistics**

See Table 16 for descriptive statistics and Table 17 for correlations among the primary measures from Study 6. Correlations among the pre-assessment of bias measures are provided in Table 18, and correlations between the expected and perceived bias measures are provided in Table 19.

**How were participants biased?**

**Subjective bias.** A three-way between-subjects ANOVA tested the effects of research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious), and order (evaluated research first vs. assessed bias first) on ratings of research quality. There was no main effect for order, $F(1, 372) = 2.63, p = 0.11$, but there was a main effect for religious orientation, $F(1, 372) = 11.94, p = .001, d = 0.31$. Overall, religious participants ($M = 5.30, SD = 1.77$) rated the research more favorably than did non-religious participants ($M = 4.61, SD = 1.71$). There was also a
marginally significant main effect for research findings, $F(1, 372) = 3.33, p < .07, d = 0.16$, but this effect was qualified by an interaction between research findings and religious orientation, $F(1, 372) = 119.84, p < .001, d = 1.10$.

Simple effects performed on religious orientation revealed subjective bias among both religious and non-religious participants: religious participants rated religion-enhancing research ($M = 6.15, SD = 1.23$) more favorably than religious-disparaging research ($M = 4.17, SD = 1.74$), $t(200) = 09.47, p < .001$, and non-religious participants rated religion-disparaging research ($M = 5.31, SD = 1.55$) more favorably than religion-enhancing research ($M = 3.89, SD = 1.56$), $t(176) = 6.62, p < .001$ (see Figure 3). All other interactions were nonsignificant, $F$’s $< 1.70, p$’s $> 0.19$.

Across levels of religiosity, participants rated belief-consistent evidence ($M = 5.78, SD = 1.44$) more favorably than belief-inconsistent evidence ($M = 4.03, SD = 1.65$), $t(378) = -11.06, p < .001, d = 1.13$ (see Figure 4).

**Absolute bias.** To assess absolute bias, participants responded to five items, reporting the total number of studies they read, the number of studies that favored religious and non-religious individuals, and the percentage of studies that favored religious and non-religious individuals.

**Recall.** As in Study 5, many participants interpreted the summary sets as the number of studies rather than the overall number of studies described. The mean number of studies participants reported reading was 5.57 ($SD = 2.30$), the median was 5, and the mode was 4. As a result, the number of studies participants reported that favored the group indicated by the research (i.e., the number those in the religion-enhancing condition reported favored religious individuals and the number those in the religion-

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24 See footnotes 18-19 for how ambiguous responses were coded.
disparaging condition reported favored non-religious individuals) was divided by the total number of studies they reported reading.25 Because this calculated percentage was moderately strongly correlated with the overall estimated percentage participants generated,26 $r(326) = 0.51$, $p < .001$, the calculated and generated percentages were combined into a single composite measure. These two items were first averaged ($\alpha = 0.67$) and then eighty was subtracted from the average to create an overall measure of absolute bias in recall (i.e., deviation from the correct response, with 0 representing no bias). Analyses conducted separately for the calculated and generated percentages are available in the Supplementary Materials. Participants were fairly accurate at recalling what the research found ($M = 3.75$, $SD = 12.28$; $Median = 1.54$; $Mode = 20$, and the second most common response was 0).

A three-way between-subjects ANOVA was conducted to examine whether research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious), and order (evaluated research first vs. assessed bias first) affected absolute bias in recall (i.e., deviation from the correct percentage of studies that favored the group indicated by the research). If participants exhibited absolute bias, a two-way interaction between research findings and religious orientation should emerge, with religious participants in the religion-disparaging condition and non-religious participants in the religion-enhancing condition underestimating the correct percentage and religious participants in the religion-enhancing condition and non-religious participants in the religion-disparaging condition overestimating the correct percentage.

25 7 participants reported numbers of studies favoring religious and non-religious individuals that exceeded the total number of studies they reported reading and thus were excluded from analyses containing this variable.
26 7 participants also reported percentages of studies favoring religious and non-religious individuals that exceeded 100 and were excluded from analyses containing this variable.
Because participants may recall the findings more accurately when doing so immediately after their presentation (i.e., when evaluating the research before assessing their bias), order was included as a factor in this analysis.

The analysis revealed a marginally significant main effect for research findings, $F(1, 316) = 3.20, p < .08, d = 0.20$, qualified by an interaction between research findings and order, $F(1, 316) = 8.23, p = .004, d = 0.32$. There was also a marginally significant interaction between and religious orientation and order, $F(1, 316) = 3.66, p = .057, d = 0.21$. Among those who assessed their bias before evaluating the research, participants in the religion-disparaging condition over-reported the percentage of studies favoring non-religious individuals ($M = 7.81, SD = 13.83$) more than those in the religion-enhancing condition over-reported favoring religious individuals ($M = 2.10, SD = 10.40$), $t(160) = 3.00, p = .002$. Among those who assessed their bias first, religious participants ($M = 6.73, SD = 11.79$) over-reported the percentage of studies favoring the group indicated by the research more than did non-religious participants ($M = 2.44, SD = 12.52$), $t(159) = -2.24, p < .03$. These differences were not significant among those who evaluated the research before assessing their bias, $|t|’s < 0.66, p > 0.51$. The two-way interaction between research findings and religious orientation, $F(1, 316) = 0.00, p = 0.99$ (see Figure 15), and the three-way interaction among research findings, religious orientation, and order, $F(1, 316) = 0.01, p = 0.91$, were nonsignificant.

Across levels of religiosity, there was no difference in absolute bias between those presented with belief-consistent and belief-inconsistent evidence, $t(322) = -0.32, p = 0.75$ (see Figure 16).
Misrecall. An additional absolute bias measure was created by examining participants’ responses to the questions that were incongruent with the research findings they received (the “favored non-religious individuals” questions for participants in the religion-enhancing condition and “favored religious individuals” questions for participants in the religion-disparaging condition). As before, a percentage was calculated by dividing the number of studies participants incorrectly reported favored the opposite group (than what the research showed) by the total number of studies they reported reading. Because this calculated percentage was moderately strongly correlated with the percentage participants generated, \( r(326) = 0.55, p < .001 \), the calculated and generated percentages were combined into a single composite measure of absolute bias in misrecall (\( \alpha = 0.70 \)). The correct response to these questions was 0, so no constant needed to be subtracted from the mean. (Analyses conducted separately for the calculated and generated percentages are available in the Supplementary Materials). Overall, participants tended to correctly recall that few to no studies favored the other group (\( M = 4.88, SD = 10.32; \) Median = 0; Mode = 0).

A three-way ANOVA was conducted to examine the effects of research findings, religious orientation, and order on this alternative measure of absolute bias (misrecall). In this analysis, absolute bias would emerge if those presented with inconsistent evidence (i.e., religious participants in the religion-disparaging condition and non-religious participants in the religion-enhancing condition) were more likely than those presented with consistent evidence (i.e., religious participants in the religion-enhancing condition and non-religious participants in the religion-disparaging condition) to misrecall studies.

\(^{27}\) Participants also reported percentages of studies favoring religious and non-religious individuals that exceeded 100 and were excluded from analyses containing this variable.
favoring the opposite group as shown by the research (i.e., the in-group for those presented with inconsistent evidence). This analysis produced an interaction between research findings and order, \( F(1, 316) = 4.80, p < .03, d = 0.24 \). Among those who assessed their bias before evaluating the research, participants in the religion-enhancing condition over-reported the percentage of studies favoring non-religious individuals \( (M = 5.52, SD = 9.78) \) more than those in the religion-disparaging condition over-reported favoring religious individuals \( (M = 2.13, SD = 6.83) \), \( t(160) = -2.50, p = .01 \). This difference was not significant among those who evaluated the research before assessing their bias, \( t(162) = 0.75, p = 0.45 \). All other main effects and interactions were nonsignificant, \( F’s < 2.39, p’s > 0.12 \) (see Figure 15).

Across levels of religiosity, there was no difference in misrecall between those presented with belief-consistent and inconsistent evidence, \( t(322) = -0.05, p = 0.96 \) (see Figure 16).

**Belief change.** A mixed-model ANOVA compared participants’ beliefs before the manipulation (T1), after the manipulation (T2), and perceived belief at T1 after the manipulation. In this analysis, research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious), and order (evaluated research first vs. assessed bias first) were included as between-subjects factors and time of belief assessment (pre-manipulation, post-manipulation, and post-manipulation perceived belief at T1) was included as a within-subjects factor. Belief change would be demonstrated by a two-way interaction between research findings and time of belief assessment, such that, across levels of religiosity, those in the religion-enhancing condition report believing that religiosity is more strongly associated with positive
outcomes at T2 than at T1, whereas those in the religion-disparaging condition report believing that religiosity is less strongly associated with positively outcomes at T2 than at T1. Order was included as a factor in this analysis in case the delay between the manipulation and reporting one’s belief affected belief change. In addition, participants’ perceived belief at T1 (reported after the manipulation) was compared to beliefs at T1 and T2 to assess whether participants perceived or were aware of any shifts in their beliefs.

This analysis produced a main effect for religious orientation, $F(1, 372) = 213.44, p < .001, d = 1.26$. Across times of assessment, religious participants ($M = 6.92$) reported believing that religiosity is more strongly associated with positive life outcomes than did non-religious participants ($M = 4.72$). There was also a main effect for research findings, $F(1, 372) = 5.80, p < .02, d = 0.18$, but this effect was qualified by a significant interaction between research findings and time of belief assessment (linear: $F(1, 372) = 4.34, p < .04, d = 0.05$; quadratic: $F(1, 372) = 55.24, p < .001, d = 0.27$). Simple effects performed on research findings revealed significant quadratic effects among those in the religion-enhancing, $F(1, 202) = 22.84, p < .001$, and religion-disparaging conditions, $F(1, 176) = 29.87, p < .001$. Participants in the religion-enhancing condition reported believing that religiosity is more strongly associated with positive life outcomes at T2 ($M = 6.47, SD = 2.05$) than at T1 ($M = 5.98, SD = 2.03$), and correctly recalled that they believed religiosity was less strongly associated with positive outcomes at T1 ($M = 5.99, SD = 2.07$). Similarly, participants in the religion-disparaging condition reported believing that religiosity is less strongly associated with positive outcomes at T2 ($M = 5.18, SD = 2.15$) than at T1 ($M = 5.95, SD = 1.90$), and correctly recalled that they
believed religiosity was more strongly associated with positive outcomes at T1 ($M = 5.72, SD = 1.89$; see Figure 17).

To assess belief change across levels of religiosity, responses to the question asking how religiosity is related to life outcomes (at T1 and T2) were first recoded among those in the religion-disparaging condition so that higher scores indicated holding a stronger belief in the direction of what the research showed (i.e., higher scores indicated believing that religiosity is more strongly associated with positive life outcomes for those in the religion-enhancing condition but more strongly associated with negative life outcomes for those in the religion-disparaging condition). This recoded measure of beliefs before the manipulation (T1) was then subtracted from the recoded measure of T2 beliefs to create a measure of belief change (higher scores indicated greater belief change in the direction of what the research found). There was no difference in belief change between those presented with belief-consistent and belief-inconsistent evidence, $t(397) = 1.23, p = 0.22$.

**Relationship among subjective bias, absolute bias, and belief change.** See Supplementary Materials for relationships among the different measures of bias.

**Awareness of Bias**

**Pre-assessment of bias (Expected bias).** Participants expected their evaluations of the research to be more “influenced by their pre-existing views” (indirect bias T1: $M = 3.81, SD = 1.89$) than they expected to be “biased” when evaluating the research (direct bias T1: $M = 3.01, SD = 1.78$), $t(388) = 9.40, p < .001, d = 0.48$ (see Figure 22), though these two measures moderately strongly correlated, $r = 0.59, p < .001$. Participants also

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$^{28}$ See Supplementary Materials for analyses examining whether pre-assessment of bias measure order (inconsistent questions first vs. consistent questions first) affected participants’ expectations for bias.
expected to exert slightly more effort critiquing studies that conflicted with ($M = 4.82$, $SD = 1.65$) than supported ($M = 4.61$, $SD = 1.77$) their views on religiosity and life outcomes, $t(388) = 2.76$, $p = .006$, $d = 0.14$, be more skeptical of studies that conflicted with ($M = 3.84$, $SD = 1.75$) than supported ($M = 2.80$, $SD = 1.60$) their views, $t(388) = 10.25$, $p < .001$, $d = 0.61$, and feel more defensive in response to studies that conflicted with ($M = 3.11$, $SD = 1.68$) vs. supported ($M = 2.50$, $SD = 1.76$) their views, $t(388) = 6.87$, $p < .001$, $d = 0.25$ (see Figure 23).

Even so, expecting to exert more effort critiquing belief-inconsistent studies was positively associated with expecting to exert more effort critiquing belief-consistent studies, $r = 0.61$, $p < .001$, expecting to be more skeptical of belief-inconsistent studies was positively associated with expecting to be more skeptical of belief-consistent studies, $r = 0.29$, $p < .001$, and expecting to feel more defensive in response to belief-inconsistent studies was associated with expecting to feel more defensive in response to belief-consistent studies, $r = 0.49$, $p < .001$ (see Table 18). Expectations for evaluations to be “influenced by pre-existing views” and “biased” were positively correlated with expected defensiveness, effort critiquing, and skepticism in response to belief-inconsistent evidence (and correlated with some of these measures for belief-consistent evidence; see Table 18).

**Post-assessment of bias (Perceived bias).** After presented with the research, participants rated their evaluations as slightly more “influenced by their pre-existing views” ($indirect$ $bias$ $T2$: $M = 2.96$, $SD = 1.84$) than they rated themselves as “biased” in evaluating the research ($direct$ $bias$ $T2$: $M = 2.73$, $SD = 1.80$), $t(382) = 3.19$, $p = .002$, $d = 0.16$ (see Figure 22), though these two measures remained strongly correlated, $r = 0.68$, $p$
< .001. Overall, participants reported exerting moderately strong effort critiquing the research \((M = 5.19, SD = 1.56)\), some skepticism of the research \((M = 3.93, SD = 1.81)\), and feeling only slightly defensive in response to the research \((M = 2.22, SD = 1.70)\); see Figure 22). Perceived indirect and direct bias were associated with perceived defensiveness and skepticism but not perceived effort critiquing the research (see Table 19).

Participants reported greater defensiveness in response to belief-inconsistent \((M = 2.91, SD = 1.90)\) vs. consistent \((M = 1.62, SD = 1.24)\) evidence, \(t(378) = 7.92, p < .001, d = 0.80\), and greater skepticism in response to belief-inconsistent \((M = 4.67, SD = 1.66)\) vs. consistent \((M = 3.28, SD = 1.70)\) evidence, \(t(378) = 8.06, p < .001, d = 0.83\) (see Figure 23). However, there was no difference between those presented with belief-inconsistent and consistent evidence in how strongly they believed their evaluations were influenced by their pre-existing views, \(t(378) = -1.21, p = 0.23\), how biased they believed they were, \(t(378) = 0.39, p = 0.70\), or how much effort they exerted critiquing the research, \(t(378) = 0.18, p = 0.86\) (see Figure 23).

**Pre vs. post-assessment of bias (Expected and perceived bias).** Correlational analyses were conducted to examine correspondence between expectations for bias and perceived bias. For these correlations, pre-manipulation responses to the inconsistent defensiveness, effort critiquing, and skepticism were used for participants who were subsequently presented with belief-inconsistent evidence, and pre-manipulation responses to the consistent items were used for participants subsequently presented with belief-consistent evidence.
Participants’ expectations about the extent to which their evaluations would be influenced by their pre-existing views showed moderate correspondence with the extent to which they perceived their evaluations were influenced by their views, $r = 0.33, p < .001$, and participants’ expected bias moderately corresponded with how biased they believed they were, $r = 0.34, p < .001$ (see Table 19). Likewise, participants’ expected effort critiquing the research was positively associated with their perceived effort critiquing the research, $r = 0.40, p < .001$, their expected skepticism was positively associated with their perceived skepticism, $r = 0.30, p < .001$, and their expected defensiveness was positively associated with their perceived defensiveness, $r = 0.48, p < .001$ (see Table 19).

**Time of bias assessment (pre vs. post-manipulation), post-manipulation order (assessed bias first vs. evaluated research first), and research consistency (belief-consistent vs. belief-inconsistent).** For each self-assessment of bias measure, a mixed model ANOVA was performed to examine the effects of research consistency (belief-consistent vs. inconsistent), post-manipulation order (assessed bias first vs. evaluated research first), and time of bias assessment (pre vs. post-manipulation) on self-assessments of bias. In the analyses for defensiveness, effort critiquing, and skepticism, pre-manipulation responses to the inconsistent (i.e., “conflict with”) items were used for participants who were subsequently presented with belief-inconsistent evidence, and pre-manipulation responses to the consistent (“i.e., “support”) items were used for participants subsequently presented with belief-consistent evidence.

If participants expect to be and perceive themselves as more biased in response to belief-inconsistent vs. consistent evidence, main effects for research consistency should
emerge, with participants reporting greater expected and perceived bias in response to belief-inconsistent vs. consistent evidence. (A time of bias assessment x research consistency interaction may emerge if participants only perceive themselves as more biased in response to inconsistent vs. consistent evidence after reading it). If explicitly evaluating research increases awareness of bias, a main effect for post-manipulation order should emerge as in the previous studies, with participants reporting greater bias when explicitly evaluating the research before assessing their bias (vs. vice versa). If evaluating research (even when not done explicitly) increases awareness of bias, then an interaction between time of bias assessment and post-manipulation order should occur, such that, among those who assess their bias before evaluating the research, participants report greater bias after the manipulation (at T2) than before (at T1) (and this difference in self-reported bias between T1 and T2 may be even more pronounced among those explicitly evaluate the research before assessing their bias). If evaluating research (when not done explicitly) only increases awareness of bias in response to belief-inconsistent evidence, then a three-way time of bias assessment x post-manipulation order x research consistency interaction would emerge.

For indirect self-reported bias, there was a main effect for time of bias assessment, $F(1, 376) = 58.42, p < .001, d = 0.45$. Participants expected their evaluations of the research to be more influenced by their pre-existing views at T1 ($M = 3.80, SD = 1.90$) than they believed actually were at T2 ($M = 2.96, SD = 1.84$). There was no main effect for research consistency, $F(1, 376) = 0.37, p = 0.54$, but there was a main effect for post-manipulation order, $F(1, 376) = 17.03, p < .001, d = 0.34$. Across time of bias assessment, participants who explicitly evaluated the research first reported that their
evaluations would be/were more strongly influenced by their pre-existing views than did those who assessed their bias first. However, because the order manipulation could not have had an effect on participants’ responses before it was administered, a follow-up analysis compared post-manipulation responses to this item between those who evaluated the research first and assessed their bias first. This analysis showed that participants who explicitly evaluated the research first ($M = 3.35, SD = 1.78$) perceived their evaluations as more strongly influenced by their pre-existing views than did those who assessed their bias first ($M = 2.58, SD = 1.81$), $t(381) = -4.20, p < .001, d = 0.43$ (see Figure 24). All other interactions were nonsignificant, $F$’s < 1.66, $p$’s > 0.19.

For direct self-reported bias, the main effect for consistency was nonsignificant, $F(1, 376) = 0.48, p = 0.49$, but there was a main effect for time of bias assessment, $F(1, 376) = 9.71, p = .002, d = 0.17$. Participants expected to be more biased at T1 ($M = 3.03, SD = 1.79$) than they believed they actually were at T2 ($M = 2.73, SD = 1.81$). There was also a main effect for post-manipulation order, $F(1, 376) = 4.20, p = .04, d = 0.18$, but this effect was qualified by an interaction between post-manipulation order and time of bias assessment, $F(1, 376) = 3.96, p < .05, d = 0.11$. Participants who assessed their bias before evaluating the research believed they were less biased at T2 ($M = 2.47, SD = 1.83$) than they expected at T1 ($M = 2.98, SD = 1.81$), $t(192) = 3.54, p = .001$, whereas participants who evaluated the research first believed they were as biased at T2 as they expected at T1, $t(189) = 0.80, p = 0.43$ (see Figure 24).

For defensiveness, there was a main effect for time of bias assessment, $F(1, 376) = 38.18, p < .001, d = 0.31$. Participants expected to feel more defensive at T1 ($M = 2.78, SD = 1.75$) than they reported feeling at T2 ($M = 2.22, SD = 1.70$). There was also a main
effort for research consistency, $F(1, 376) = 37.70, p < .001, d = 0.53$, but this effect was qualified by a significant research consistency x time of bias assessment interaction, $F(1, 376) = 19.47, p < .001, d = 0.22$. Participants presented with belief-consistent evidence felt less defensive at T2 ($M = 1.62, SD = 1.24$) than they expected at T1 ($M = 2.55, SD = 1.77$), whereas those presented with belief-inconsistent evidence felt as defensive at T2 ($M = 2.91, SD = 1.90$) as they expected at T1 ($M = 3.06, SD = 1.70$), $t(174) = 1.04, p = 0.30$. A three-way interaction among research consistency, time of bias assessment, and post-manipulation order, $F(1, 376) = 10.51, p = .001, d = 0.16$, indicated that this pattern was significant among those who assessed their bias first, $F(1, 188) = 29.73, p < .001$, but not among those who evaluated the research first, $F(1, 188) = 0.68, p = 0.41$.29

For effort critiquing the research, there was a main effect for time of bias assessment, $F(1, 376) = 23.05, p < .001, d = 0.27$. Participants believed they exerted more effort critiquing the research at T2 ($M = 5.18, SD = 1.56$) than they expected they would at T1 ($M = 4.74, SD = 1.68$). There were also significant time of bias assessment x post-manipulation order, $F(1, 376) = 7.37, p = .007, d = 0.15$, and post-manipulation x research consistency interactions, $F(1, 376) = 12.64, p < .001, d = 0.30$. Participants who evaluated the research first believed they exerted more effort critiquing the research at T2 ($M = 5.32, SD = 1.38$) than they expected at T1 ($M = 4.64, SD = 1.71$), $t(189) = -5.41, p < .001$, whereas this difference did not reach statistical significance among those who assessed their bias first, $t(189) = -1.50, p = 0.14$ (see Figure 24). Both participants presented with belief-inconsistent, $t(174) = -2.79, p = .006$, and belief-consistent, $t(204) = -4.04, p < .001$, evidence believed they exerted more effort critiquing the research at T2 (belief-inconsistent: $M = 4.79, SD = 1.67$; belief-consistent: $M = 4.70, SD = 1.69$) than

29 All other main effects and interactions were nonsignificant, $F$’s $< 1.18, p$’s $> 0.27$. 
they expected at T1 (belief-inconsistent: $M = 5.19, SD = 1.56$; belief-consistent: $M = 5.17, SD = 1.57$); the interaction between research consistency and time of bias assessment may have emerged because there was a stronger correlation between expected and perceived effort for those presented with belief-consistent evidence, $r(205) = 0.48, p < .001$, than there was among those presented with belief-inconsistent evidence, $r(175) = 0.31, p < .001$.\(^{30}\)

For skepticism, there were main effects for time of bias assessment, $F(1, 376) = 42.46, p < .001, d = 0.39$, and research consistency, $F(1, 376) = 72.39, p < .001, d = 0.67$. Participants reported greater skepticism at T2 ($M = 3.92, SD = 1.81$) than they expected at T1 ($M = 3.25, SD = 1.73$), and participants expected/experienced greater skepticism in response to belief-inconsistent ($M = 4.21$) vs. consistent evidence ($M = 3.06$). There were also interactions between time of bias assessment and research consistency, $F(1, 376) = 5.33, p = .02, d = 0.14$, and time of bias assessment and post-manipulation order, $F(1, 376) = 7.41, p = .008, d = 0.16$. Participants presented with belief-consistent evidence reported greater skepticism at T2 ($M = 3.28, SD = 1.70$) than they expected at T1 ($M = 2.83, SD = 1.60$), $t(204) = -3.12, p = .002$; however, those presented with belief-inconsistent evidence reported even greater skepticism at T2 ($M = 4.67, SD = 1.66$) than they expected at T1 ($M = 3.74, SD = 1.75$), $t(174) = -5.92, p < .001$.\(^{31}\) Participants who evaluated the research first reported greater skepticism at T2 ($M = 4.09, SD = 1.67$) than they expected at T1 ($M = 3.13, SD = 1.71$), $t(189) = -7.05, p < .001$ (see Figure 24). Participants who assessed their bias first also reported greater skepticism at T2 ($M = 3.75$, \(\ldots\))

\(^{30}\) All other main effects and interactions were nonsignificant, $F$’s < 0.41, $p$’s > 0.52.
\(^{31}\) Participants also expected to be more skeptical of belief-inconsistent vs. belief-consistent evidence at T1.
$SD = 1.94$) than at T1 ($M = 3.36, SD = 1.75$), $t(189) = -2.37, p = .02$, but the difference was less pronounced (see Figure 24).  

**Correspondence of expected and perceived bias with actual bias.** A series of regression analyses was performed to examine whether participants’ expectations for bias and perceptions of bias corresponded to the measures of actual bias (subjective bias, absolute bias, and belief change). To examine whether participants reliably predicted how biased they actually were, correspondence between the expectations for bias (at T1) measures and each measure of actual bias was assessed. To examine awareness of bias when actually evaluating research, correspondence between the perceived bias measures (at T2) and the measures of actual bias was assessed (as in the previous studies). For each analysis, the self-assessment of bias measure and research consistency were entered as predictors of subjective bias in Step 1, and a research consistency x self-assessment of bias interaction term was entered in Step 2. **Correspondence with subjective measure of bias.**

**Pre-assessment of bias (Expected bias).** If participants reliably predicted how biased they actually were, then greater expectations for “evaluations to be influenced by pre-existing views” and to be “biased” should be associated with evaluating belief-consistent evidence more favorably and evaluating belief-inconsistent evidence more harshly.

For expected indirect bias, research consistency predicted subjective bias (i.e., research evaluations), $\beta = 0.50, B = 1.75, SE = 0.16, t = 11.08, p < .001$, such that participants presented with belief-consistent evidence rated the research as higher in

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32 All other main effects and interactions were nonsignificant, $F$’s $< 0.49, p$’s $> 0.48$.

33 See Supplementary Materials for correspondence between expected and perceived defensiveness, effort critiquing, skepticism and subjective bias.
quality than did those presented with belief-inconsistent evidence. Expectations for evaluations to be influenced by pre-existing views (indirect bias T1) did not predict subjective bias, $\beta = 0.05, B = 0.05, SE = 0.04, t = 1.20, p = 0.23$, but there was a marginally significant indirect bias T1 x research consistency interaction, $\beta = 0.32, B = 0.16, SE = 0.08, t = 1.90, p = .058$. Among participants presented with belief-inconsistent evidence, expectations for evaluations to be influenced by pre-existing views at T1 were unrelated to subjective bias, $\beta = -0.04, B = -0.03, SE = 0.07, t = -0.52, p = 0.60$; however, among those presented with belief-consistent evidence, greater expectations for evaluations to be influenced by pre-existing views predicted more favorable research evaluations, $\beta = 0.16, B = 0.12, SE = 0.05, t = 2.35, p = 0.02$.

Neither expectations for bias (direct bias T1), $\beta = 0.01, B = 0.01, SE = 0.04, t = 0.20, p = 0.84$, nor the interaction between expectations for bias and research consistency, $\beta = 0.25, B = 0.14, SE = 0.09, t = 1.57, p = 0.12$, significantly predicted subjective bias.

**Post-assessment of bias (Perceived bias).** If participants were aware of how biased they actually were, then greater admissions that “evaluations were influenced by pre-existing views” and “bias” should be associated with evaluating belief-consistent evidence more favorably and evaluating belief-inconsistent evidence more harshly.

Indirect self-reported bias (T2) was not a significant predictor of research evaluations, $\beta = .05, B = .05, SE = .04, t = 1.08, p = .28$. However, there was a significant research consistency x indirect self-reported bias T2 interaction, $\beta = 0.75, B = 0.38, SE = 0.09, t = 4.52, p < .001$ (see Table 5). Simple slopes analyses indicated that, when the research was inconsistent with participants’ beliefs, perceiving that evaluations were more strongly influenced by pre-existing views was associated with evaluating research
more harshly, $\beta = -0.19$, $B = -0.18$, $SE = .07$, $t = -2.52$, $p = .01$, whereas when the research was consistent with their beliefs, perceiving that evaluations were more strongly influenced by pre-existing views was associated with evaluating the research quality more favorably, $\beta = 0.28$, $B = 0.21$, $SE = .05$, $t = 4.08$, $p < .001$ (see Table 5). The strength of the relationship between indirect self-reported bias and research evaluations (i.e., the absolute value of the coefficients) did not significantly differ between those presented with belief-consistent and belief-inconsistent evidence, $z = 0.89$, $p = 0.37$.

Direct self-reported bias at T2 marginally predicted subjective bias, $\beta = -0.09$, $B = -0.08$, $SE = 0.04$, $t = -1.91$, $p = .057$. However, this effect was qualified by an interaction between direct bias x research consistency, $\beta = 0.66$, $B = 0.36$, $SE = 0.09$, $t = 4.24$, $p < .001$ (see Table 5). Among those presented with belief-inconsistent evidence, greater self-reported bias at T2 was associated with evaluating the research more harshly, $\beta = -0.31$, $B = -0.28$, $SE = 0.07$, $t = -4.23$, $p < .001$, whereas self-reported bias was not significantly related to subjective bias for those presented with belief-consistent evidence, $\beta = 0.11$, $B = 0.09$, $SE = 0.06$, $t = 1.52$, $p = .13$ (see Table 5). The relationship between direct self-reported bias and research evaluations (i.e., the absolute value of the coefficients) was stronger for those presented with belief-inconsistent vs. consistent evidence, $z = 2.02$, $p = 0.04$.

**Correspondence with absolute bias.**

The same analytic strategy used to assess correspondence between self-assessment of bias and subjective bias was applied to examine correspondence between the pre and post-assessment of bias measures and absolute bias.

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34 See Supplementary Materials for correspondence between expected and perceived defensiveness, effort critiquing, and skepticism and absolute bias.
**Pre-assessment of bias (Expected bias).** Indirect bias T1 (i.e., expectations for evaluations to be influenced by pre-existing views) did not predict the percentage of studies participants recalled favoring the group indicated by the research or misrecalled favoring the opposite group, t’s < 1.65, p’s > 0.10. The interaction between misrecall and research consistency approached significance, β = -0.37, B = -1.05, SE = 0.61, t = -1.73, p = .085. Among those presented with inconsistent evidence, expectations for evaluations to be influenced by pre-existing views were positively associated with misrecalling a greater percentage of studies favoring the opposite group (i.e., one’s in-group), β = 0.19, B = 1.07, SE = 0.45, t = 2.39, p = .02, but unrelated to misrecall among those presented with belief-consistent evidence, β = 0.00, B = 0.02, SE = 0.41, t = 0.05, p = .96.

Expected bias (direct bias T1) did not predict or interact with research consistency to predict either absolute bias measure, t’s < 0.92, p’s > 0.35.

**Post-assessment of bias (Perceived bias).** Indirect self-reported bias at T2 did not predict, β = -0.05, B = -0.35, SE = 0.37, t = -0.92, p = .36, or interact with research consistency to predict, β = -0.14, B = -0.51, SE = 0.76, t = -0.67, p = .51, absolute bias on the recall measure. Indirect bias at T2 also did not predict absolute bias on the misrecall measure, β = -0.02, B = -0.09, SE = 0.32, t = -0.30, p = .77 (see Table 11). Indirect bias at T2 did marginally interact with research consistency, β = 0.38, B = 1.15, SE = 0.64, t = 1.79, p = .07, but neither simple slope analysis for those presented with consistent and inconsistency evidence was statistically significant, t’s ≤ 1.55, p’s > 0.12.

Neither perceived bias nor the interaction between perceived bias at T2 and research consistency predicted either absolute bias measure, t’s < 0.77, p’s > 0.44 (see Table 11).
Correspondence with belief change. Correspondence between the self-assessment of bias measures and belief change was assessed following the data analytic strategy used for subjective and absolute bias.

Pre-assessment of bias (Expected bias). Expectations for evaluations to be influenced by pre-existing views (indirect bias at T1) did not predict belief change, $\beta = 0.08$, $B = 0.08$, $SE = 0.05$, $t = 1.64$, $p = 0.10$. The interaction between indirect bias at T1 and research consistency was also nonsignificant, $\beta = -0.24$, $B = -0.12$, $SE = 0.09$, $t = -1.23$, $p = .21$.

Neither expected bias (direct bias at T1), $\beta = 0.06$, $B = 0.06$, $SE = 0.05$, $t = 1.12$, $p = .27$, nor the interaction between expected bias and research consistency, $\beta = -0.28$, $B = -0.15$, $SE = 0.10$, $t = -1.53$, $p = .13$, predicted belief change.

Post-assessment of bias (Perceived bias). Neither post-assessment of bias measure predicted, or interacted with research consistency to predict, belief change, $r's < 0.90$, $p's > 0.37$ (see Table 12).

Discounting vs. Supporting Science

Discounting the ability of science to study the particular research question. A two-way ANOVA examined the effects of research findings (religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious) on the extent to which participants agreed that the question addressed by the research could not be answered using scientific methods. This analysis produced a main effect for religious orientation, $F(1, 376) = 14.45$, $p < .001$, $d = 0.38$. Religious participants ($M = 4.55$, $SD = 2.16$) were more likely to agree that the question could not be answered using scientific methods.

See Supplementary Materials for correspondence between expected and perceived defensiveness, effort critiquing, and skepticism and belief change.
methods than were non-religious participants ($M = 3.82, SD = 2.03$). There was also an interaction between research findings and religious orientation, $F(1, 376) = 29.80, p < .001, d = 0.55$. Non-religious participants were more likely to discount the ability of science to provide answers to the research question when presented with religion-enhancing ($M = 4.48, SD = 2.05$) vs. religious-disparaging ($M = 3.18, SD = 1.81$) findings, $t(176) = -4.49, p < .001$, whereas religious participants were more likely to discount the ability of science to provide answers to the question when presented with religion-disparaging ($M = 5.11, SD = 2.19$) vs. religion-enhancing ($M = 4.13, SD = 2.04$) findings, $t(200) = 3.29, p = .001$ (see Figure 6).

Across levels of religiosity, participants more strongly agreed that the question could not be answered using scientific methods when presented with belief-inconsistent ($M = 4.79, SD = 2.14$) vs. belief-consistent ($M = 3.71, SD = 2.00$) findings, $t(378) = 5.10, p < .001, d = 0.52$ (see Figure 7).

**Support for science in general.** A two-way ANOVA tested the effects of research findings (religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious) on overall support for science. This analysis produced main effects for research findings, $F(1, 376) = 3.92, p = .049, d = 0.20$, and religious orientation, $F(1, 376) = 19.37, p < .001, d = 0.44$. Participants in the religion-enhancing condition ($M = 5.44, SD = 0.90$) reported slightly greater overall support for science than did those in the religion-disparaging condition ($M = 5.26, SD = 1.10$). Religious participants ($M = 5.17, SD = 1.06$) reported lower overall support for science than did non-religious participants ($M = 5.57, SD = 0.87$). There was also a significant interaction between religious orientation and research consistency, $F(1, 376) = 12.21, p = .001, d =$
0.35. Religious participants reported lower support for science in the religion-disparaging 
\( (M = 4.86, SD = 1.19) \) vs. religion-enhancing condition \( (M = 5.40, SD = 0.89) \), \( t(200) = -3.70, p < .001 \) (see Figure 8). The difference in support for science between non-religious 
participants in the religion-enhancing \( (M = 5.49, SD = 0.90) \) and religion-disparaging \( (M = 5.64, SD = 0.84) \) conditions was not significant, \( t(176) = 1.15, p = 0.25 \) (see Figure 8). 

Across levels of religiosity, participants presented with belief-inconsistent 
findings \( (M = 5.18, SD = 1.10) \) reported slightly less overall support for science than did 
those presented with belief-consistent findings \( (M = 5.51, SD = 0.87) \), \( t(378) = -3.25, p = .001, d = 0.33 \) (see Figure 9).

**Summary**

Study 6 largely replicated and extended the findings from Study 5. Participants 
exhibited bias in how they evaluated the quality of the evidence consistent or inconsistent 
with their views but overall were quite accurate in recalling what the research showed. 
There was some variability in recall; participants tended to overestimate the percentage of 
studies that favored the group indicated by the research, and there were some differences 
in recall depending on whether participants recalled the findings immediately following 
their presentation or after a delay (overestimating occurred among particular groups when 
there was a delay between presentation and recall). However, the patterns observed were 
not consistent with a demonstration of bias. That is, participants did not recall greater or 
fewer studies favoring the group indicated by the research or misrecall greater or fewer 
studies favoring the opposite group as shown by the research based on whether the 
findings were congruent or incongruent with their views. These findings suggest that 
people’s beliefs do not bias their recall of research findings, at least when asked to recall
the findings shortly after reading them. Presumably, it would be difficult for strong subjective and absolute bias effects to emerge simultaneously, in that people likely need to remember research findings in order to evaluate consistent findings favorably and inconsistent findings unfavorably.

Despite the fact that participants rated research challenging their beliefs more harshly than research supporting their views, they still shifted their beliefs in the direction of the evidence presented. (Overall, evaluating research more favorably was associated with greater belief change). In addition, participants were aware that the research changed their views, in that they accurately recalled their belief at the beginning of the study. Participants shifted their beliefs to the same extent regardless of whether the findings were inconsistent or consistent with their views (though there was more room for shifting among those presented with inconsistent evidence). These findings suggest that although people certainly have their biases, they are not completely biased by their pre-existing views and do exhibit some rationality.

The fact that there are different forms of bias adds complexity to the question of how aware people are of their bias. In this study, awareness of bias was assessed in multiple ways. Participants rated the extent to which their evaluations were influenced by their pre-existing views, how biased, defensive, and skeptical they were, and how much effort they exerted critiquing the research. Overall, self-assessments of bias tended to correspond with evaluations of research quality (i.e., subjective bias) but not recall of the research findings (i.e., absolute bias) or belief change.

Participants were more likely to report that their evaluations of the research were “influenced by their pre-existing views” than they were “biased.” Before reading about
the research, participants also expected their evaluations to be more influenced by their pre-existing views than they expected to be biased. Even so, these two measures were strongly correlated with one another and showed similar patterns of correspondence with the subjective measure of bias. People seem to associate bias with having pre-existing views influence responses but may perceive bias somewhat differently and/or dislike labeling themselves as biased. However, as in Study 5, the direct measure of bias was only associated with subjective bias for those presented with belief-inconsistent evidence. Therefore, people appear to more strongly associate “bias” with how they evaluated inconsistent than consistent evidence, perhaps because the word bias has a negative connotation (and inconsistent evidence is evaluated harshly).

Participants associated defensiveness and skepticism with (both indirect and direct) bias, but not effort critiquing research. In fact, whereas perceived defensiveness and skepticism were associated with evaluating research more harshly, perceived effort critiquing (both belief-consistent and inconsistent) research was associated with more favorable research evaluations. Participants expected to exert more effort critiquing belief-inconsistent vs. consistent evidence (and be more defensive and skeptical in response to it). However, although participants reported feeling more defensive and skeptical of belief-inconsistent vs. belief-consistent evidence, they did not report exerting more effort critiquing belief-inconsistent evidence. Thus, participants appeared to recognize the affective (e.g., defensiveness, skepticism) and cognitive (e.g., greater effort critiquing belief-inconsistent vs. consistent evidence) processes that define biased information processing but only believe they experienced the affective processes.
It is certainly possible that participants *only* engaged in the affective processes in this study. Participants in the present research did appear to exhibit more even-handedness than those in previous research, changing their beliefs in response to the evidence and accurately recalling their initial belief. Furthermore, in contrast to Studies 3-5, participants reported equal levels of bias in response to belief-consistent and inconsistent evidence in this study. Having participants report their expectations for bias before the manipulation may have drew their attention to their potential for bias, motivating them to remain objective when reading the research. In fact, participants expected to be more biased than they subsequently believed they were. However, this finding is consistent with previous research suggesting that people recognize their general susceptibility to bias but believe they are objective in any specific instance when actually assessing their bias (Ehrlinger, Gilovich, & Ross, 2005). Therefore, although it is possible that participants remained largely objective in this study, it seems unlikely given (1) the large body of prior evidence suggesting that people exert more effort critiquing belief-inconsistent than consistent evidence (e.g., Ditto & Lopez, 1992; Ditto et al., 1998; Lord et al., 1979; Munro & Ditto, 1997; Taber & Lodge, 2006) and (2) the fact that participants exhibited subjective bias as strongly in Study 6 as they did in the previous studies.

As in Studies 4 and 5, participants reported greater bias when explicitly evaluating the research before assessing their bias than when assessing their bias before explicitly evaluating the research. Study 6 also extended Studies 4 and 5 by examining whether evaluating research, even if not done explicitly, draws attention to bias. Because people likely automatically evaluate research as they read it, Study 6 compared (1)
expectations for bias before participants knew the outcome to the research to (2) perceptions of bias among those who had not explicitly evaluated research to (3) perceptions of bias among those who had explicitly evaluated the research. Participants who assessed their bias before explicitly evaluating the research believed they were less biased than they expected, whereas those who explicitly evaluated the research first believed they were as biased as they expected. These findings suggest that reading about research and forming an automatic evaluation of it decreases awareness of bias. As previously stated, people appear to recognize their general susceptibility to bias but believe they are objective when actually assessing their bias. In fact, research has shown that the more people rely on introspective evidence to assess their bias, the less biased they believe they were (Pronin & Krugler, 2007). Explicitly evaluating research may counteract this process of introspection, in that participants’ attention is drawn to concrete evidence of their bias (i.e., their evaluations of the research).

Before drawing strong conclusions regarding the ineffectiveness of introspection and effectiveness of explicitly evaluating research in increasing awareness of bias, further evidence is needed to determine whether recording one’s expectations for bias alters subsequent perceived and actual bias. In the present study, although participants’ expectations for bias corresponded to their perceived bias, their expectations for bias were largely unrelated to the measures of actual bias (subjective bias, absolute bias, and belief change). For the most part, people do not appear to be able to predict how biased they will be (though they can predict how biased they thought they were).

Lastly, Study 6 found a similar pattern of results to the previous studies regarding the effects of belief-relevant evidence on support for science. Participants were more
likely to discount the ability of science to provide answers to the research question when presented with belief-inconsistent (vs. consistent) evidence and reported slightly lower general support for science when presented with belief-inconsistent (vs. consistent) evidence (though the difference in support for science was only significant among religious participants in this study). Overall, belief-relevant evidence appeared to influence trust in the research topic under investigation more strongly than general support for science.

**General Discussion**

The six studies presented here provide a great deal of information regarding how people are biased when presented with belief-relevant evidence, their awareness of their biases, and how belief-relevant evidence influences perceptions of science. Although the results from these studies are insufficient to provide complete answers to these questions, they raise a number of narrower, more specific questions for future research that will advance our understanding of the broader questions more fully. Below, I describe the conclusions that can be drawn from the present data and outline the next steps for investigating the questions raised by this research.

**Bias vs. Accuracy: To what extent are people biased in evaluating, recalling, and maintaining (vs. changing) their beliefs in response to belief-relevant evidence?**

The present research investigated bias vs. accuracy in processing belief-relevant evidence by examining different forms of bias. In particular, these studies examined (1) subjective bias (i.e., the classic form of bias in the motivated reasoning literature, observed in ratings of the quality of belief-relevant evidence, a judgment without an objective, correct response), (2) absolute bias (i.e., bias in recalling the results of belief-
relevant studies, a question with an objective, correct response), and (3) belief maintenance (i.e., bias against updating one’s beliefs following the presentation of belief-relevant evidence).

Every study testing for subjective bias (i.e., Studies 2-6) replicated the confirmation bias effect (see Table 20a): participants rated research consistent with their beliefs more favorably than research challenging their views. Across every study, this was a strong effect (see Table 20b). Participants were clearly biased when evaluating the subjective quality of the research, but they did not exhibit bias in recalling the research findings. When there were absolute criteria for assessing motivated (i.e., belief-driven) bias, no bias was observed (see Table 20). On average, participants were very accurate in recalling what the research found. Participants did tend to overestimate the percentage of studies that favored the group indicated by the research (along with the percentage of studies that favored the opposite group), but deviations from the correct response were not associated with the (in)consistency of the findings with participants’ beliefs.

Unexpectedly, although participants rated belief-consistent evidence more favorably than belief-inconsistent evidence, they still shifted their beliefs in the direction of the evidence presented (see Table 20a). Belief change was relatively modest (see Table 20b), but theorists argue that it is rational to maintain one’s beliefs to some degree (Fischhoff & Beyth-Marom, 1983; Koehler, 1993; Tversky & Kahneman, 1974). Beliefs form from prior knowledge and experience, and thus updating rather than completely changing one’s view in response to new evidence may demonstrate rationality (Tversky & Kahneman, 1974). Furthermore, the present findings suggest that people are not simply misremembering their initial belief, thinking they held the same belief all along and
denying that the evidence impacted their position. Rather, participants accurately recalled their initial belief at the end of the study. These results support the conclusion that people are motivated to both maintain their beliefs and be accurate (Hart et al., 2009).

The present findings differ from Kahan et al.’s (2013) findings, in that Kahan et al. observed absolute bias in their research. There are a number of reasons why Kahan et al. may have observed absolute bias whereas the present research did not. In Kahan et al.’s (2013) study, participants were less likely to interpret raw data correctly from a study on the effectiveness of gun control when the findings challenged their views on gun control than when the results supported their views. Kahan et al.’s measure of absolute bias was quite different than the measure used in the present research. In Kahan et al.’s study, participants were presented with a difficult pattern of results and were asked to interpret their meaning. In the present research, participants were asked to recall the results from studies, in which the findings were clear and the conclusions were specifically stated. There was room for misestimating numbers of studies presented but little room for misinterpreting the pattern shown.

Absolute bias may emerge when recalling evidence but under different conditions than those examined in this research. Participants were asked to recall the results of studies either directly after their presentation or after a short delay. Over longer periods of time (days, weeks, months), people may be more likely to misremember research findings in ways that favor their desired view (and may be more likely to forget the research altogether if it challenges vs. supports their views). Indeed, research suggests that people engage in biased memory searches in order to maintain other types of desired views (e.g., positive self-characterizations; see Kunda, 1990, for a review).
Alternatively, absolute bias may emerge when interpreting evidence but not when recalling research findings. As mentioned previously, in order for people to form a negative evaluation of belief-inconsistent evidence, they must recall the evidence as challenging their views. In fact, although absolute bias was operationalized as underestimating the percentage of studies favoring the outgroup for those presented with belief-inconsistent evidence, bias could also emerge in overestimating this percentage; that is, perceiving the research as even more threatening (by overestimating the extent to which the research challenged their views) may lead to even harsher evaluations. Furthermore, the measure of absolute bias used in the present research may have had poor reliability. Presenting studies in groups added noise to the data, leading some participants to interpret sets of studies as a single study and others to interpret each study described as a separate investigation.

Therefore, future research is needed to examine the conditions under which absolute bias emerges. Does absolute bias emerge only when interpreting research findings, or when recalling them as well? Do research findings have to be messy, mixed, and/or ambiguous for absolute bias to occur or can it emerge when findings are consistent and clear as well? Are people more likely to misrecall evidence in ways that support their desired conclusions over time? For example, are people more likely to misremember details of studies in ways that reflect favorably upon belief-consistent research (e.g., larger sample size, more consistent or stronger pattern of findings) and unfavorably upon belief-inconsistent research (e.g., smaller sample size, less consistent or strong pattern of findings)? Or are people more likely to forget the details or entire studies challenging vs. supporting their views altogether? Such studies would not only test for absolute bias but
test the limits of current process model of motivated reasoning. If people engage in more effortful, analytic processing when evaluating belief-inconsistent evidence, they would likely encode the details of the studies more deeply and be more likely to recall the details correctly. However, over time, if people misrecall details and conclusions from studies challenging their views in ways that favor their desired position, this would suggest that people are either applying analytic processing selectively or that motives interfere with long-term memory storage. Therefore, further examining when absolute bias occurs is critical to more fully understanding how people process, encode, store, and retrieve belief-relevant evidence.

The present findings also deviated from previous research in that they failed show evidence of belief perseverance or attitude polarization. Rather, in contrast to what the motivated reasoning literature suggests (e.g., Edwards & Smith, 1996; Lord et al., 1979; Miller et al., 1993), the present findings suggest that people may not always reject counter-attitudinal evidence. In previous research in which participants were presented with an evenly mixed pattern of belief-consistent and inconsistent findings, participants did not change their beliefs in response to the evidence (Kuhn & Lao, 1996; Miller et al., 1993; Munro & Ditto, 1997) or became even more polarized in the direction of their initial position (McHoskey, 1995; Taber & Lodge, 2006). In the present research, participants were presented with a consistent pattern of findings and shifted their beliefs in the direction of the evidence presented.

In fact, the results from this research support an often overlooked finding from Lord et al. (1979). Lord et al. (1979) presented participants with two studies on capital punishment, one that supported their views and one that opposed them. When Lord et al.
assessed participants’ attitudes following the presentation of just the results from the first study, they found that participants shifted their views in the direction of the evidence presented. It was only after Lord et al. provided further details about the studies that participants more strongly counterargued inconsistent than consistent evidence (and appeared to revert back to their original position, though Lord et al. did not measure beliefs at the end of the study). The studies described to participants in the present research were also quite brief, providing little information for participants to challenge.

Furthermore, many prior studies have found that people believe they adopted an even more polarized position in the direction of their initial beliefs even though no attitude change occurred (Kuhn & Lao, 1996; Lord et al., 1979; Miller et al., 1993; Munro & Ditto, 1997). In the current research, participants appeared to know that they shifted their belief in the direction of the evidence presented. Together, the results from this research suggest that people are sometimes biased, but other times quite logical.

People are less swayed by findings that are messy or mixed. Indeed, when presented with an evenly mixed pattern of belief-consistent and inconsistent findings, it seems rational not to change one’s views (unless to become more uncertain). People are constrained from using motivated reasoning to arrive at desired conclusions under certain conditions. People can only arrive at their desired conclusions if they are plausible and justifiable (Kunda, 1990). When there is little information to challenge, people seem to accept what is presented to them. However, when information is available to critique, people appear to use that information selectively to advance their desired conclusions.\textsuperscript{36}

\textsuperscript{36} It is also possible that having participants list counterarguments and methodological flaws, which researchers in the literature often have participants do after presenting details about the research, is responsible for belief perseverance effects. Counterarguing has been shown to be the most effective strategy in resisting persuasion (Jacks & Cameron, 2003). Therefore, reflecting on the counterarguments
This explanation for the discrepant findings is tentative and should be tested in future research. Interestingly, people still rate studies incongruent with their beliefs as less well done and methodologically sound, even with little information to critique. Further work is needed to understand the basis for such judgments. Do people believe their beliefs and evaluations are evidence-based or not? One possibility would be to examine the extent to which people believe they are justified for evaluating belief-inconsistent evidence more harshly than belief-consistent evidence when presented with few vs. many details about the studies.

More broadly, additional studies are needed to reconcile the differences between the current and previous research regarding when people change vs. maintain their beliefs in response to belief-relevant evidence and when people accurately perceive changes in their beliefs. Under what conditions do people change their beliefs in response to counter-attitudinal evidence (i.e., without the use of lab-based interventions like self-affirmation, e.g., Cohen, Aronson, & Steele, 2000; or listing counterarguments to one’s position, e.g., Lord et al., 1984)? How strong, consistent, and clear must the evidence be? Are people in fact more likely to accept research findings when fewer details of the studies are available to critique? Does the source of the evidence influence whether people change their beliefs or not? Surprisingly, participants shifted their beliefs even though the source credibility of the evidence was unknown (an unknown group of researchers). Because source credibility, along with evidence strength, have been shown to be important factors contributing to attitude change (Petty, Cacioppo, & Goldman, 1981; Zuwerink & Devine, participants generated in response to belief-inconsistent evidence may lead them to discredit the evidence in a way that may not occur as strongly in a natural setting.)
future research should also investigate how they affect responses to belief-relevant scientific evidence.

Research has shown that people exhibit motivated reasoning more strongly when evidence bears on strongly held, committed beliefs, particularly those based on moral convictions and values (Ditto, Pizarro, & Tannenbaum, 2009; Jacks & Devine, 1996; Liu & Ditto, 2013; Miller et al., 1993; Stanovich & West, 2007; Skitka, Bauman, & Sargis, 2005; Taber & Lodge, 2006; Tetlock, Kristel, Elson, Green, & Lerner, 2000; Toplak & Stanovich, 2003; Zuwerink & Devine, 1996). Must people not hold strong, value-laden views on a topic to change their belief? Perhaps participants in the present studies shifted their beliefs on the relationship between religiosity and life outcomes because they did not hold strong, moralized pre-existing views on the topic. They may have preferred for the research to favor their group and felt some threat in response to evidence reflecting unfavorably upon their group, but they may have felt less committed to their initial belief than they would in response to evidence challenging deeply ingrained beliefs, such as those examined in many studies in the motivated reasoning literature (e.g., capital punishment, gun control, affirmative action, homosexuality). However, it is important to note that participants in Lord et al. (1979) did initially shift their belief when presented with single study on capital punishment. Therefore, people may sometimes change even strongly held, moral beliefs.

Recent research from the political science literature suggests that the nature of negative emotions experienced in response to belief-inconsistent evidence may influence whether people respond to evidence in an open-minded or defensive manner. These studies have found that, whereas anger promotes defensive reasoning processes, anxiety
promotes consideration of alternative viewpoints (MacKuen, Wolak, Keele & Marcus, 2010; Weeks, 2015). The studies described in this research may have induced more anxiety than anger, prompting more even-handed consideration of the evidence and leading participants to shift their beliefs. (If the research induced anxiety, it could also be responsible for the absence of absolute bias). The particular emotions and responses to different types of evidence, along with the extent to which belief change processes generalize across research topic, demand further investigation.

Because bias manifests somewhat differently when evaluating belief-consistent evidence than it does when evaluating belief-inconsistent evidence, determining whether people are more biased in response to one type of evidence or the other may be a difficult question, without a clear answer. Even so, the present research suggests that people may be equally biased when evaluating belief-inconsistent evidence as they are when evaluating belief-consistent evidence. There were no differences in absolute bias or belief change between those presented with belief-inconsistent and consistent evidence (though those presented with consistent evidence have less room to strengthen their belief than those presented with inconsistent evidence have to shift their belief in the alternate direction). However, the question of whether people are more biased when evaluating belief-inconsistent or consistent evidence requires further investigation using different measures of absolute bias, along with including a control condition in testing for differences in subjective bias. That is, the present studies (and the motivated reasoning literature more generally) cannot answer the question of whether people exhibit more subjective bias when evaluating belief-consistent or inconsistent evidence because these studies often contain no control group (i.e., a group with neutral prior views).
Awareness of bias: When evaluating belief-relevant evidence, to what extent are people aware of their bias? Are there circumstances under which people are more or less aware of their bias?

The present research also examined people’s awareness of their engagement in motivated reasoning under different circumstances (see Table 21 for a summary). Although theorists have argued that people are unaware of their bias (e.g., Haidt, 2001), given evidence suggesting that people may sometimes recognize their bias (e.g., Hansen et al., 2014; Perry et al., 2015), I predicted that participants may express some awareness of their bias.

In support of this hypothesis, participants appeared to express some awareness of the bias they exhibit(ed) when presented with belief-relevant evidence. Across the various measures of bias, participants reported that they were slightly to somewhat biased when evaluating belief-relevant evidence, and in all studies in which participants were actually presented with evidence (i.e., Studies 2-6), self-reported bias showed weak to moderate correspondence with subjective bias (the only measure that seemed to capture strong evidence of bias in this research; see Table 20).

Overall, the present findings suggest that people possess some awareness of the bias they exhibit when presented with belief-relevant evidence. However, awareness of bias varied across conditions and measures of assessment. When asked about their general susceptibility to motivated reasoning bias, participants expressed quite a sophisticated lay understanding of motivated reasoning processes. They acknowledged that they experience negative affect and defensiveness in response to information challenging their views and exhibit some bias when evaluating belief-threatening
evidence (ignoring, discrediting, or challenging it). Consistent with many theories regarding why people are motivated to defend their beliefs (e.g., terror management, self-affirmation), participants recognized that people strive to protect beliefs because beliefs are a central component of the self-concept. Additionally, supporting Bayesian perspectives on confirmation bias (Fischhoff & Beyth-Marom, 1983; Koehler, 1993; Tversky & Kahneman, 1974), most participants recognized that motivated reasoning is advantageous and people should give preference to their beliefs, but that people should consider alternative information as well.

When anticipating reading about research on the relationship between religiosity and life outcomes, participants expected their evaluations of the research to be somewhat influenced by their pre-existing views and slightly biased (see Figure 22). After reading about the research, however, participants believed their evaluations were less influenced by their pre-existing views and less biased than they expected (see Figure 22), though participants still admitted that their evaluations were somewhat influenced by their pre-existing views and that they were slightly biased (see Figure 5). These differences in expected and perceived bias were weak to moderate in strength (see Table 22) and support previous research suggesting that people recognize their general susceptibility to bias more than they recognize their bias in specific instances (Ehrlinger et al., 2005). In fact, research suggests that the more people engage in introspection to assess their bias, they less biased they believed they were (Pronin & Krugler, 2007).

When anticipating reading about research on the relationship between religiosity and life outcomes, participants expressed some awareness of their susceptibility to the affective and cognitive processes that define biased information processing. They
expected to feel greater defensiveness and skepticism in response to belief-inconsistent vs. consistent research and expected to exert (slightly) more effort critiquing belief-inconsistent vs. consistent research (see Figure 22). After reading about the research, participants expressed some awareness of experiencing the affective processes that define biased information processing. They reported feeling slightly defensive in response to belief-inconsistent evidence (see Figure 5) and some skepticism of both consistent and inconsistent evidence, though greater skepticism of inconsistent evidence (see Figure 23). However, participants reported exerting moderately strong effort critiquing both belief-consistent and inconsistent evidence (see Figure 23). It is important to note that, in the present research, participants only received brief summaries of the studies. As discussed above, if people exhibit greater bias when given more information to critique, then people may report more effort critiquing belief-inconsistent vs. consistent evidence when the studies are described in more detail than they were in the present research. Even so, participants did not expect to exert considerable more effort critiquing inconsistent than consistent evidence before the studies were presented, suggesting that people may not associate differential effort critiquing belief-consistent vs. belief-inconsistent research with bias.

Future studies investigating awareness of bias should more closely examine whether the affective and cognitive processes that define biased information processing correspond to self-reports of bias. To do so, studies should assess these processes on-line as participants are experiencing them. For example, researchers could measure defensiveness, threat, anger, anxiety, and positive affect immediately following the presentation of evidence, along with measuring the number of counterarguments
participants generate, the length of time they spend reading the studies and generating counterarguments, and whether participants immediately accept or reject the information presented. Among those presented with inconsistent evidence, positive associations between defensiveness, threat, anger, and self-reports of bias and a negative association between anxiety and self-reported bias would suggest that people are aware of the affective processes that define biased information processing for inconsistent evidence. Correspondence between positive affect and self-reports of bias among those presented with consistent evidence would suggest that people are aware of the affective processes associated with biased information processing for consistent evidence. Awareness of engaging in the cognitive processes that define biased information processing would be demonstrated if greater self-reports of bias correspond to spending longer analyzing belief-inconsistent (vs. consistent) evidence, generating more counterarguments in response to inconsistent (vs. consistent) evidence, and immediately rejecting inconsistent evidence and immediately accepting belief-consistent evidence (at least for those who experience anger in response to belief-inconsistent evidence; see MacKuen et al., 2010; Weeks, 2015).

Along with comparing expectations for bias to perceptions of bias, this research examined awareness of bias under different conditions: after explicitly evaluating research vs. after reading about research under control conditions. Studies 4-6 found that, when the order of explicitly evaluating the research and assessing bias was manipulated, participants reported greater bias when explicitly evaluating the research first than when assessing their bias first (see Table 21). In each study, a moderately strong difference was observed between conditions (see Table 22).
To examine whether evaluating research the way people tend to evaluate itnatural settings increases awareness of bias (i.e., forming an automatic judgment of it as they read it, without explicitly recording evaluations of the research), Study 6 compared expectations for bias to self-reports of bias immediately after participants read about the research (i.e., among those who assessed their bias before explicitly evaluating the research). As previously stated, under these conditions, participants believed they were less biased than they expected. However, participants rated their expected bias similarly to their perceived bias when explicitly evaluating the research before assessing their bias. These findings suggest that explicitly evaluating research can counteract the interference of faulty introspection efforts to assess one’s bias (Pronin & Krugler, 2007). Recording harsh ratings of belief-inconsistent evidence and favorable ratings of belief-inconsistent evidence may provide participants with concrete criteria with which to assess their bias in a way that simply reflecting on their response to the research does not. Although this effect replicated across all three studies in which it was tested, it is unclear whether explicitly evaluating research actually increases awareness of bias or only increases overall ratings of bias. Given the potential for explicitly evaluating research to serve as an effective intervention in drawing attention to bias, this question should be tested further in future research.

While explicitly evaluating research may be an effective means of drawing attention to bias when research is only briefly summarized (with few details available to critique), when research is described in more detail, explicitly evaluating the research may decrease perceptions of bias in response to belief-inconsistent evidence. That is, having participants generate counterarguments and list flaws of the research may lead
participants to believe they were justified in evaluating the research harshly. Of course, if people recognize their strong effort to undermine belief-inconsistent evidence, evaluating research more thoroughly may also increase perceptions of bias.

Along with examining whether more thorough evaluations of research increase awareness of bias, further research is needed investigating awareness of bias among those with different levels of knowledge and expertise on a topic. Some evidence suggests that people with greater cognitive ability and knowledge on a topic are more prone to exhibit motivated reasoning biases because they are better equipped to generate strong counterarguments in response to evidence challenging their views (e.g., Kahan, 2013; Liu, 2016). Therefore, people with more knowledge, expertise, and cognitive ability (i.e., those often involved in conducting, disseminating, and applying research) may be less aware of their bias (and most likely to have their biases impact society). Indeed, research has shown that reviewers evaluate manuscripts (identical except for the direction of the findings) more harshly when the findings challenge their views than when they support them (Abramowitz, Abramowitz, & Gomes, 1975). Thus, evaluating research may be ineffective in drawing researchers’ attention to their bias.

In four of six cases, participants presented with belief-inconsistent evidence reported greater bias than those presented with consistent evidence (see Table 21). The strength of the observed differences was relatively weak (see Table 22), suggesting that people may not be significantly more aware of their bias when presented with belief-inconsistent (vs. consistent) evidence and may perceive themselves as similarly biased when evaluating both belief-inconsistent than consistent evidence. However, if people are less likely to interpret their favorable reaction to and easy acceptance of belief-consistent
evidence as bias than they are to interpret their defensive reaction to and efforts to undermine belief-inconsistent evidence as bias, this carries important implications for determining how motivated reasoning can be reduced.

Indeed, from the present findings, it remains unclear what people perceive as bias. Participants in this research rated their evaluations as more “influenced by their pre-existing views” than “biased” (see Table 22). These indirect and direct assessment of bias measures were strongly correlated, but they tended to show different patterns of correspondence with the subjective bias measure. Across Studies 2-6, there was a trend for indirect bias to correspond more strongly with subjective bias for those presented with belief-consistent vs. belief-inconsistent evidence (though the difference in strength of association was only significant for the religiosity research in Study 3). In both studies that contained the direct bias measure, direct bias corresponded more strongly with subjective bias for those presented with inconsistent vs. consistent evidence. These differences in correspondence may be attributed to different connotations of each question wording. Having evaluations be “influenced by pre-existing views” may be more readily interpreted as having a favorable influence rather than an unfavorable one (though participants still rated their evaluations of inconsistent evidence as equally or more influenced by their pre-existing views). The explicit use of “bias” in the direct bias question may have shown stronger correspondence with subjective bias for those presented with inconsistent (vs. consistent) evidence because bias has a negative connotation, which participants may associate with harsh evaluations.

Participants clearly associated having evaluations be “influenced by pre-existing views” with “bias,” but the observed differences in ratings and patterns of
correspondence raise the question of what people perceive the difference to be between being biased and having evaluations be influenced by prior views. Are the differences purely artifacts of the question wording? Are people motivated not to view themselves as biased? Are people less likely to associate easy acceptance and favorable ratings of belief-consistent evidence with bias than they are strong critiques and unfavorable evaluations of belief-inconsistent evidence? These questions should be explored in future research. Participants’ (unanalyzed) responses to the open-ended questions asking why they believed they were biased or not may provide some preliminary insight into the question of what people believe it means to be biased. From the present findings, it is also unclear whether the order of presenting the self-assessment of bias measures affected responses. Because the indirect question was always presented before the direct measure, future studies examining differences between indirect and direct assessments of bias may benefit from counterbalancing the order in which the measures are presented.

Self-reported bias was consistently associated with subjective bias, suggesting that participants defined bias in part as whether they evaluated belief-consistent evidence favorably and belief-inconsistent evidence unfavorably. However, self-reported bias (indirect and direct) was largely unrelated to absolute bias and belief change (with the exception of Study 4 for belief change; see Tables 12 and 20). Because it is unclear exactly what participants perceived bias to be (i.e., did they think of bias primarily in its subjective form or did they define it in other ways as well), the data provide only preliminary evidence regarding people’s awareness of bias. In other words, the modest relationships between self-reported bias and subjective bias may reflect the fact that people understand that bias exists in different forms and recognize that they did not
exhibit strong bias in these other ways. In order to more fully understand how aware people are of their bias, future research should investigate exactly what people perceive bias to be and aim to maximize the bias people exhibit in different forms. Indeed, people cannot be aware of biases that do not exist.

Although the extent to which people exhibit and are aware of their bias in different circumstances remains unclear, people clearly believe that others are more biased than they are themselves. Both studies that compared perceptions of one’s own bias to others’ bias (i.e., Studies 1 and 3) replicated the bias blind spot effect (Pronin et al., 2002): participants believed that others exhibit greater bias (i.e., more defensiveness and bias and less objectivity) than themselves (see Table 21). Participants also showed an in-group-out-group bias blind spot, perceiving religious and political out-group members to exhibit greater bias than in-group members. In addition, participants appeared to project their biases onto others, believing others would be more biased if they perceived themselves as more biased.

Participants made attributions regarding the researchers’ religious and political views based on the research findings and perceived the researchers as more biased when the findings were inconsistent vs. consistent with their beliefs. Interestingly, however, participants rated the researchers as less biased than themselves. In contrast to recent public opinion polls (YouGov, 2013), this finding suggests that people may not perceive researchers examining social issues as completely biased and untrustworthy. In fact, given that participants changed their beliefs in response to the evidence, these results suggest that people may view social scientists as more trustworthy and objective than has been claimed (Lilienfeld, 2012; YouGov, 2013). Alternatively, demand characteristics
may have led participants to rate the researchers as more objective than they truly perceived them to be. The question of whether laypeople believe scientists’ biases compromise their research should be further explored in future research, given its importance for the broader impact of scientific knowledge. In addition, future research should examine whether laypeople perceive scientists as more biased in some fields than in others and when studying particular topics versus others.

**Perceptions of Science: How does exposure to belief-inconsistent evidence, compared to belief-consistent evidence, influence support for science?**

The final question explored in this research was how belief-relevant evidence affects perceptions of science. Although I expected exposure to belief-inconsistent (vs. consistent) evidence to reduce support for science, participants presented with belief-inconsistent (vs. consistent) evidence only reported lower overall support for science in three of five studies (see Table 23a). When differences were observed, they were relatively weak (see Table 23b). Moreover, there was no effect of belief-relevant evidence on behavioral support for science: participants presented with belief-inconsistent evidence were no less willing to donate to the NSF or advocate for increased funding for social science research than were those presented with belief-consistent evidence (see Table 23).

Although belief-inconsistent (vs. belief-consistent) evidence did not strongly reduce overall support for science, it did impact trust in research on the particular topic under investigation. Consistent with public opinion polls suggesting that people endorse science but reject its findings (Funk & Rainie, 2015), the scientific impotence effect (Munro, 2010) was replicated in five of six cases (see Table 23a)—that is, participants
were more likely to discount the ability of science to provide answers to the research question when presented with information challenging vs. supporting their views. With the exception of the political research in Study 3, moderately strong effects were observed across the studies (see Table 23b).

The fact that the scientific impotence effect emerged each time participants were presented with research on religiosity and life outcomes but not when presented with research on political ideology and analytic ability suggests that whether the scientific impotence effect occurs may depend on the research topic presented. People may perceive the question of whether religiosity is related to life outcomes as more broad and open to interpretation than they perceive differences between liberals and conservatives on reasoning tests. Determining whether and when people discredit science’s ability to provide answers to questions is important for understanding and predicting how laypeople will respond to research findings and for exploring ways to increase trust in the results of scientific investigations, even when findings challenge cherished beliefs. Certainly, approaching scientific research with skepticism is valuable, but denying the ability of science to ever provide answers to an empirical question is not.

Although the present findings suggest that the presentation of belief-inconsistent evidence on a single (or two) topics does not strongly reduce overall support for science, it is possible that the presentation of multiple belief-threatening studies on a range of topics would have a different impact on overall support for science. Based on the findings from Study 3, exposure to mixed evidence (on the same topic or a range of topics) may have an equally strong or stronger effect on reducing overall support for science. Indeed, it would seem quite logical for exposure to discrepant findings to reduce trust in science.
Furthermore, although belief-inconsistent vs. consistent findings from a social science study did not strongly reduce overall support for science, it is possible that the evidence would have a stronger effect on support for social science research. The behavioral measure assessing willingness to advocate for increased funding for science was directed toward social science research and showed no difference in willingness to advocate between those presented with inconsistent and consistent evidence. However, given that people tend to view social science research as unscientific (Lilienfeld, 2012), examining whether belief-threatenng (social science) research reduces general support for social science should be tested in future research.

Future studies examining the effects of belief-relevant evidence on support for science and trust in research on the topic under investigation should include a control group of individuals without pre-existing views or preferences on the research topic. From the current findings, it is unknown whether belief-inconsistent evidence decreased trust in research on the topic presented and/or whether belief-consistent evidence increased trust in research on the topic. Including a control group would enable a direct test of this question.

**Conclusion**

In conclusion, this research examined how people are biased when presented with belief-relevant evidence, awareness of their bias in different circumstances, and whether exposure to belief-inconsistent (vs. consistent) evidence reduces support for science. Replicating over 40 years of research on motivated reasoning and confirmation bias, participants exhibited bias in evaluating the subjective quality of research, rating studies congruent with their beliefs more favorably than studies challenging their views. Despite
this evidence of bias, participants also demonstrated considerable accuracy and
rationality—accurately recalling the research findings and shifting their beliefs in the
direction of the evidence presented.

Furthermore, the present findings suggest that people possess some awareness of
their bias, although awareness of bias varied under different circumstances. Participants
were more likely to report bias when asked abstractly and indirectly (i.e., their general
susceptibility to bias and whether their evaluations were “influenced by their pre-existing
views”) than when asked directly and concretely (i.e., in specific instances and when
assessing their “bias”). Under control conditions, participants believed they were less
biased than they expected, but when they explicitly evaluated the research before
assessing their bias, participants believed they were as biased as they expected. These
findings support previous research indicating that relying on introspection to assess bias
may be ineffective in accurately perceiving bias (Pronin & Krugler, 2007), and also
extend such research, suggesting that providing explicit information with which to assess
bias (e.g., evaluations of the research) may aid people in accurately assessing their bias.

Belief-inconsistent (vs. consistent) evidence reduced trust in research on the
particular topic under investigation more strongly than overall support for science
(whether measured attitudinally or behaviorally). Although participants perceived the
researchers as more biased when the findings challenged vs. supported their views, they
viewed the researchers as less biased than themselves.

The results from this research simultaneously hold positive implications for
science while posing challenges for science. People appear to hold quite a sophisticated
lay understanding of motivated reasoning processes, be somewhat aware of their bias,
and may be made more aware of their bias. People may view researchers as less biased than themselves (though they may not trust scientists’ opinions more than their own). At least upon initial exposure, when provided with clear, consistent evidence, people may not distort research findings and may actually change their beliefs in response to the evidence. In addition, exposure to belief-threatening evidence does not appear to greatly reduce general support for science.

At the same time, consistent with recent public opinion polls, the present findings suggest that people support science in general while placing little trust in particular scientific findings (Funk & Rainie, 2015; YouGov, 2013). People rate evidence challenging their views more harshly than evidence supporting their views, even when little information is available to critique. Although people possess some awareness of their bias, they believe others are more biased than they are themselves. Explicitly evaluating research may increase awareness of bias, but people do not explicitly record evaluations of research in real-life settings. Although people may rate researchers as less biased than themselves, their perceptions of scientists as biased or objective may often depend on whether their findings support their beliefs.

People may change their beliefs if exposed to clear, consistent evidence on a topic, but people rarely spontaneously seek out disconfirmatory evidence in real world settings (Kleck & Wheaton, 1967; Koriat, Lichtenstein, & Fischhoff, 1980), or if they do, they selectively expose themselves to weak arguments challenging their views while ignoring strong arguments opposing their beliefs (Kleinhesselink & Edwards, 1975). Furthermore, people may be unlikely to change their beliefs when study details are available to critique or when findings are more messy or ambiguous, as is often the case.
Given growing concerns about the validity of many published scientific findings (e.g., Begley & Ellis, 2012; Ioannidis, 2005; Open Science Collaboration, 2015), it is important for laypeople and scientists alike to approach research findings with skepticism and doubt, seeking out the details of scientific investigations to learn what the researchers actually did and found. However, if people simply reject evidence at face value, seek out further details about a study with the main goal of discrediting it, or fail to engage in such practices when presented with information supporting their views, motivated reasoning poses a serious obstacle to the advancement of scientific knowledge. This is particularly problematic for society given recent evidence suggesting that those most likely to be involved in conducting and implementing research (i.e., those with more knowledge on a topic) may be the most likely to exhibit bias (e.g., Kahan, 2013; Liu, 2016).

Therefore, future research investigating how laypeople and scientists can be made aware of their biases and process information more objectively is critical to the integrity of the scientific enterprise. Information gained from such research may be invaluable in developing new practices for conducting, disseminating, and implementing research in order to increase the validity of scientific claims, science literacy, and the broader impact of scientific findings.
Table 1

*Descriptive Statistics (Study 1)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>People should give preference to consistent information</td>
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<td>1.20</td>
</tr>
<tr>
<td>People should consider inconsistent information</td>
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<td>1.13</td>
</tr>
<tr>
<td>Negative affect (self)</td>
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<td>Positive affect (self)</td>
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<td>Objectivity (self)</td>
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<tr>
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</tr>
<tr>
<td>Defensiveness (others)</td>
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</tr>
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<td>Objectivity (others)</td>
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<tr>
<td>Political orientation</td>
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</tr>
<tr>
<td>Religiosity</td>
<td>4.14</td>
<td>2.08</td>
</tr>
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</table>

*Note.*

a Ratings of the extent to which people should give preference to information consistent with their beliefs on a 7-point scale ranging from 1 (not at all) to 7 (completely).
b Ratings of the extent to which people should consider information challenging their beliefs on a 7-point scale ranging from 1 (not at all) to 7 (completely).
c Participants’ ratings of own negative affect, positive affect, objectivity, defensiveness, and ignoring, discrediting, and challenging evidence when presented with belief-inconsistent evidence. Items were rated on 7-point scales, with higher numbers representing greater negative and positive affect, objectivity, defensiveness, and ignoring, discrediting, and challenging evidence.
d Participants’ ratings of others’ negative affect, positive affect, objectivity, defensiveness, and ignoring, discrediting, and challenging evidence when presented with belief-inconsistent evidence. Items were rated on 7-point scales, with higher numbers representing greater negative and positive affect, objectivity, defensiveness, and ignoring, discrediting, and challenging evidence.
e Political orientation="How would you describe your political orientation?" (1=very conservative, 7=very liberal).
f Religiosity="I consider myself a religious individual" (1=strongly disagree, 7=strongly agree).
Table 2

Correlations among continuous measures (Study 1)

<table>
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<th>2</th>
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<tbody>
<tr>
<td>1. People should give preference to consistent information&lt;sup&gt;a&lt;/sup&gt;</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
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</tr>
<tr>
<td>2. People should consider inconsistent information&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.05</td>
<td>---</td>
<td>---</td>
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<td>---</td>
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</tr>
<tr>
<td>3. Negative affect (self)&lt;sup&gt;c&lt;/sup&gt;</td>
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</tr>
<tr>
<td>4. Positive affect (self)&lt;sup&gt;c&lt;/sup&gt;</td>
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<td>0.11</td>
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</tr>
<tr>
<td>5. Ignore, discredit, and challenge (self)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.05</td>
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<td>0.40***</td>
<td>-0.09</td>
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</tr>
<tr>
<td>6. Defensiveness (self)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.22*</td>
<td>-0.03</td>
<td>0.55***</td>
<td>-0.12</td>
<td>0.52***</td>
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<tr>
<td>7. Objectivity (self)&lt;sup&gt;c&lt;/sup&gt;</td>
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<td>0.23*</td>
<td>-0.34***</td>
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<td>-0.07</td>
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<tr>
<td>8. Ignore, discredit, and challenge (others)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.15</td>
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<td>0.18</td>
<td>-0.26*</td>
<td>0.06</td>
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<td>9. Defensiveness (others)&lt;sup&gt;d&lt;/sup&gt;</td>
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<td>-0.04</td>
<td>-0.26*</td>
<td>0.03</td>
<td>0.16</td>
</tr>
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<td>10. Objectivity (others)&lt;sup&gt;d&lt;/sup&gt;</td>
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<td>-0.20</td>
<td>0.03</td>
<td>0.20</td>
<td>0.16</td>
<td>0.23*</td>
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<tr>
<td>11. Political orientation&lt;sup&gt;e&lt;/sup&gt;</td>
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<td>0.12</td>
<td>-0.13</td>
<td>-0.11</td>
<td>-0.17</td>
<td>-0.23*</td>
</tr>
<tr>
<td>12. Religiosity&lt;sup&gt;f&lt;/sup&gt;</td>
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<td>0.06</td>
<td>0.19</td>
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<table>
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<tr>
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<tr>
<td>8. Ignore, discredit, and challenge (others)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>-0.06</td>
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<tr>
<td>9. Defensiveness (others)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.27**</td>
<td>0.16</td>
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<tr>
<td>10. Objectivity (others)&lt;sup&gt;d&lt;/sup&gt;</td>
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<td>-0.19</td>
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<tr>
<td>11. Political orientation&lt;sup&gt;e&lt;/sup&gt;</td>
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<td>0.02</td>
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<tr>
<td>12. Religiosity&lt;sup&gt;f&lt;/sup&gt;</td>
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<td>0.05</td>
<td>-0.07</td>
<td>0.15</td>
<td>-0.18</td>
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</table>

Note. *p < .05. **p ≤ .01. ***p ≤ .001. *Ratings of the extent to which people should give preference to information consistent with their beliefs on a 7-point scale ranging from 1 (not at all) to 7 (completely).

*Ratings of the extent to which people should consider information challenging their beliefs on a 7-point scale ranging from 1 (not at all) to 7 (completely).

*Participants’ ratings of negative affect, positive affect, objectivity, defensiveness, and ignoring, discrediting, and challenging evidence when presented with belief-inconsistent evidence. Items were rated on 7-point scales, with higher numbers representing greater negative and positive affect, objectivity, defensiveness, and ignoring, discrediting, and challenging evidence.

*Participants’ ratings of others’ negative affect, positive affect, objectivity, defensiveness, and ignoring, discrediting, and challenging evidence when presented with belief-inconsistent evidence. Items were rated on 7-point scales, with higher numbers representing greater negative and positive affect, objectivity, defensiveness, and ignoring, discrediting, and challenging evidence.
Political orientation=“How would you describe your political orientation?” (1=very conservative, 7=very liberal).
Religiosity=“I consider myself a religious individual” (1=strongly disagree, 7=strongly agree).
Table 3

*Descriptive Statistics (Study 2)*

<table>
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<tr>
<th>Variable</th>
<th>Overall</th>
<th>Inconsistent&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Consistent&lt;sup&gt;a&lt;/sup&gt;</th>
<th>t</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective bias (evaluations)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.57</td>
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<td>-6.36***</td>
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<td>Indirect bias&lt;sup&gt;c&lt;/sup&gt;</td>
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</table>

*Note.* †p = .054. ***p ≤ .001. Blank cells indicate that it did not make sense to compare participants who received belief-consistent and inconsistent evidence on this variable.

<sup>a</sup>Participants who received inconsistent evidence were non-religious participants in the religion-enhancing condition and religious participants in the religion-disparaging condition. Participants who received consistent evidence were non-religious participants in the religion-disparaging condition and religious participants in the religion-enhancing condition.

<sup>b</sup>Subjective bias=evaluations of the research quality. Scores on this measure ranged from 1 to 8, with higher numbers indicating more favorable research evaluations.

<sup>c</sup>Indirect bias=self-reports of the extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1=not at all, 7=completely).

<sup>d</sup>Scientific impotence=belief that the question addressed by the research cannot be answered using scientific methods (1=strongly disagree, 8=strongly agree).

<sup>e</sup>General support for science= overall support for/trust in scientific research (1=not at all, 7=completely).

<sup>f</sup>Religiosity=“I consider myself a religious individual” (1=strongly disagree, 6=strongly agree).
Table 4

*Correlations among measures (Study 2)*

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<td>-0.31(^***)</td>
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*Note.* \(^*p < .05. \(^**p \leq .01. \(^***p \leq .001.*

\(^a\) Subjective bias=evaluations of the research quality. Scores on this measure ranged from 1 to 8, with higher numbers indicating more favorable research evaluations.

\(^b\) Indirect bias=self-reports of the extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1=not at all, 7=completely).

\(^c\) Scientific impotence=belief that the question addressed by the research cannot be answered using scientific methods (1=strongly disagree, 8=strongly agree).

\(^d\) General support for science= overall support for/trust in scientific research (1=not at all, 7=completely).

\(^e\) Religiosity="I consider myself a religious individual” (1=strongly disagree, 6=strongly agree).
Table 5

Correspondence between Perceived Bias and Subjective Bias

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</table>

Note. *p < .05. **p ≤ .01. ***p ≤ .001. For each regression analysis, consistency and the assessment of bias measure (indirect bias, direct bias, defensiveness, objectivity, effort, or skepticism) were entered as predictors of subjective bias in Step 1, and the interaction was entered in Step 2. Simple slopes analyses are provided for all significant interactions. Blank cells indicate that analyses could not be conducted because the particular self-assessment of bias measure was not included in the study.

<sup>a</sup> Subjective bias=evaluations of the research quality. Scores on this measure ranged from 1 to 8, with higher numbers indicating more favorable research evaluations.

<sup>b</sup> The consistency variable was coded as 1=inconsistent, 2=consistent. Participants who received inconsistent evidence were non-religious participants in the religion-enhancing condition and religious participants in the religion-disparaging condition. Participants who received consistent evidence were non-religious participants in the religion-disparaging condition and religious participants in the religion-enhancing condition.

<sup>c</sup> Indirect bias=extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1=not at all, 7=completely).

<sup>d</sup> Direct bias=extent to which participants believed they were biased in evaluating the research (1=not at all, 7=completely).

<sup>e</sup> Defensiveness=extent to which participants felt defensive when reading about the research (1=not at all, 7=completely).

<sup>f</sup> Objectivity=extent to which participants believed they made a concerted effort to remain objective when reading about the research (1=not at all, 7=completely).

<sup>g</sup> Effort=perceived effort exerted critiquing the research (1=no effort, 7=strong effort)

<sup>h</sup> Skepticism=perceived skepticism of the research (1=not at all, 7=extremely).
### Descriptive Statistics (Study 3)

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<th>Overall</th>
<th>Inconsistent&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Consistent&lt;sup&gt;b&lt;/sup&gt;</th>
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<th>( d )</th>
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<td>Researcher religiosity&lt;sup&gt;i&lt;/sup&gt;</td>
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<th>Overall</th>
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<th>Consistent&lt;sup&gt;a&lt;/sup&gt;</th>
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<th>( d )</th>
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<td>Subjective bias&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
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<td>h</td>
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<tr>
<td><strong>Political orientation</strong></td>
<td>3.95</td>
<td>1.38</td>
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</table>

**Note.** *p < .05. **p ≤ .01. ***p ≤ .001. Blank cells indicate that it did not make sense to compare participants who received belief-consistent and inconsistent evidence on this variable.

* For the religiosity study, participants who received inconsistent evidence were non-religious participants in the religion-enhancing condition and religious participants in the religion-disparaging condition, and participants who received consistent evidence were non-religious participants in the religion-disparaging condition and religious participants in the religion-enhancing condition. For the political study, participants who received inconsistent evidence were conservatives in the liberal-enhancing condition and liberals in the conservative-enhancing condition, and those who received consistent evidence were conservatives in the conservative-enhancing condition and liberals in the liberal-enhancing condition. The combined general support for science analysis compared participants who received both belief-inconsistent studies, both belief-consistent studies, or one consistent and one inconsistent study (mixed).

* Subjective bias=evaluations of the research quality. Scores on this measure ranged from 1 to 8, with higher numbers indicating more favorable research evaluations.

* Indirect bias=extent to which each target’s evaluations was or would be influenced by their pre-existing views (1=not at all, 7=completely).

* Indirect bias (researcher)=extent to which the researchers’ conclusions were influenced by their pre-existing views (1=not at all, 7=completely).

* Defensiveness=extent to which each target became or would become defensive when reading about the research (1=not at all, 7=completely).

* Objectivity=extent to which each target made or would make a concerted effort to remain objective when reading about the research (1=not at all, 7=completely).

* Subjective bias (researcher)=extent to which the researchers made a concerted effort to remain objective when conducting the research (1=not at all, 7=completely).

* Scientific impotence=belief that the question addressed by the research cannot be answered using scientific methods (1=strongly disagree, 8=strongly agree).

* Researcher religiosity=beliefs about the researchers’ religiosity (1=not at all, 7=extremely, 8=don’t know); participants who selected ‘don’t know’ were excluded from these analyses.

* Researcher ideology=beliefs about the researchers’ ideology (1=strongly conservative, 7=strongly liberal, 8=don’t know); participants who selected ‘don’t know’ were excluded from these analyses.

* General support for science=overall support for/trust in scientific research (1=not at all, 7=completely).

* Religiousity=”I consider myself a religious individual” (1=strongly disagree, 6=strongly agree).

* Political orientation=“How would you describe your political orientation” (1=very conservative, 6=very liberal).
Table 7

**Correlations among primary measures (Study 3)**

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<td>1. Subjective bias (religiosity)(^a)</td>
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<tr>
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<td>0.50***</td>
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<tr>
<td>5. Scientific impotence (religiosity)(^e)</td>
<td>-0.38***</td>
<td>0.10</td>
<td>-0.06</td>
<td>-0.17**</td>
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<tr>
<td>6. Researcher religiosity(^f)</td>
<td>0.08</td>
<td>0.12**</td>
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<td>-0.09</td>
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<tr>
<td>7. Subjective bias (political)(^a)</td>
<td>0.36***</td>
<td>0.02</td>
<td>0.15*</td>
<td>0.05</td>
<td>-0.14*</td>
<td>0.01</td>
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<td>-0.20***</td>
<td>-0.04</td>
<td>0.00</td>
<td>0.15*</td>
<td>-0.01</td>
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<td>9. Defensiveness (political)(^c)</td>
<td>0.11</td>
<td>0.16**</td>
<td>-0.26***</td>
<td>-0.09</td>
<td>0.00</td>
<td>0.12</td>
<td>-0.31***</td>
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<tr>
<td>10. Objectivity (political)(^d)</td>
<td>-0.37***</td>
<td>0.39***</td>
<td>-0.09</td>
<td>-0.25***</td>
<td>0.26***</td>
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<td>-0.09</td>
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<td>11. Scientific impotence (political)(^e)</td>
<td>-0.14*</td>
<td>0.05</td>
<td>-0.08</td>
<td>-0.09</td>
<td>0.50***</td>
<td>0.02</td>
<td>-0.30***</td>
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<td>-0.03</td>
<td>0.04</td>
<td>0.01</td>
<td>-0.04</td>
<td>0.03</td>
<td>-0.13</td>
<td>0.20**</td>
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<td>0.07</td>
<td>0.18**</td>
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<td>0.12*</td>
<td>0.14*</td>
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<td>0.07</td>
<td>0.04</td>
<td>-0.07</td>
<td>0.05</td>
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<td>-0.05</td>
<td>0.01</td>
<td>-0.12*</td>
<td>0.09</td>
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<td>10. Objectivity (political)(^d)</td>
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<td>0.26***</td>
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<td>11. Scientific impotence (political)(^e)</td>
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<td>-0.04</td>
<td>0.13*</td>
<td>0.11</td>
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<td>12. Researcher ideology(^g)</td>
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<td>-0.08</td>
<td>-0.15*</td>
<td>0.05</td>
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<tr>
<td>13. General support for science(^h)</td>
<td></td>
<td>-0.10</td>
<td>-0.14*</td>
<td>-0.17**</td>
<td>-0.35***</td>
<td>-0.05</td>
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<td>14. Religiosity(^i)</td>
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<td>0.06</td>
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<td>0.19***</td>
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<td>-0.44***</td>
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<td>15. Political orientation(^j)</td>
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<td>-0.08</td>
<td>-0.19***</td>
<td>-0.18**</td>
<td>0.39***</td>
</tr>
</tbody>
</table>

\(^a\) Subjective bias=evaluations of the research quality. Scores on this measure ranged from 1 to 8, with higher numbers indicating more favorable research evaluations.

\(^b\) Indirect bias=extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1=not at all, 7=completely).

\(^c\) Defensiveness=extent to which participants felt defensive when reading about the research (1=not at all, 7=completely).
Objectivity=extent to which participants believed they made a concerted effort to remain objective when reading about the research (1=not at all, 7=completely).

Scientific impotence=belief that the question addressed by the research cannot be answered using scientific methods (1=strongly disagree, 8=strongly agree).

Researcher religiosity=beliefs about the researchers’ religiosity (1=not at all, 7=extremely, 8=don’t know); participants who selected ‘don’t know’ were excluded from these analyses.

Researcher ideology=beliefs about the researchers’ ideology (1=strongly conservative, 7=strongly liberal, 8=don’t know); participants who selected ‘don’t know’ were excluded from these analyses.

General support for science=overall support for/trust in scientific research (1=not at all, 7=completely).

Religiosity=“I consider myself a religious individual” (1=strongly disagree, 6=strongly agree).

Political orientation=“How would you describe your political orientation” (1=very conservative, 6=very liberal).
Table 8

Correlations among perceived self, other, in-group, out-group, and researcher bias (Study 3)

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<td>2. Other (Religiosity)</td>
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<tr>
<td>3. Ingroup (Religiosity)</td>
<td>0.47***</td>
<td>0.28***</td>
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<tr>
<td>4. Outgroup (Religiosity)</td>
<td>0.33***</td>
<td>0.35***</td>
<td>0.34***</td>
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<tr>
<td>5. Researcher (Religiosity)</td>
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<tr>
<td>6. Self (Political)</td>
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<tr>
<td>7. Other (Political)</td>
<td>0.12*</td>
<td>0.27***</td>
<td>0.31***</td>
<td>0.28***</td>
<td>0.08</td>
<td>0.32***</td>
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<tr>
<td>8. Ingroup (Political)</td>
<td>0.28***</td>
<td>0.25***</td>
<td>0.40***</td>
<td>0.38***</td>
<td>0.16**</td>
<td>0.52***</td>
<td>0.45***</td>
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<tr>
<td>9. Outgroup (Political)</td>
<td>0.28***</td>
<td>0.25***</td>
<td>0.39***</td>
<td>0.44***</td>
<td>0.15**</td>
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<tr>
<td>10. Researcher (Political)</td>
<td>0.25***</td>
<td>0.14*</td>
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<td>0.16**</td>
<td>0.50***</td>
<td>0.32***</td>
<td>0.23***</td>
<td>0.29***</td>
<td>0.20***</td>
</tr>
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</table>

Note. All items were rated on 7-point scales (1=not at all, 7=completely). For these analyses, the indirect bias measure was used for each target. For the self, participants rated the extent to which they believed their evaluations were influenced by their pre-existing views. For the other, ingroup, and outgroup, participants rated the extent to which they believed each target’s evaluations would be influenced by their pre-existing views. For the researchers, participants rated the extent to which the researchers’ conclusions were influenced by their pre-existing views.

*p < .05. **p < .01, ***p ≤ .001.
Table 9

**Descriptive Statistics (Study 4)**

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<tr>
<th>Variable</th>
<th>Overall</th>
<th>Inconsistent&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Consistent&lt;sup&gt;b&lt;/sup&gt;</th>
<th>t</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective bias (evaluations)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.68</td>
<td>3.72</td>
<td>5.55</td>
<td>-10.46***</td>
<td>1.09</td>
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<tr>
<td>Absolute bias (recall)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-0.06</td>
<td>-0.01</td>
<td>-0.09</td>
<td>1.01</td>
<td>0.12</td>
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<tr>
<td>Absolute bias (misrecall)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.43</td>
<td>0.38</td>
<td>0.44</td>
<td>-0.78</td>
<td>0.08</td>
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<tr>
<td>Belief (T2)&lt;sup&gt;e&lt;/sup&gt;</td>
<td>5.67</td>
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<td></td>
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<tr>
<td>Belief in what research found&lt;sup&gt;f&lt;/sup&gt;</td>
<td>5.25</td>
<td>3.93</td>
<td>6.34</td>
<td>-7.99***</td>
<td>0.34</td>
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<tr>
<td>Indirect bias&lt;sup&gt;g&lt;/sup&gt;</td>
<td>3.59</td>
<td>3.91</td>
<td>3.28</td>
<td>3.08**</td>
<td>0.32</td>
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<tr>
<td>Defensiveness&lt;sup&gt;h&lt;/sup&gt;</td>
<td>2.21</td>
<td>3.00</td>
<td>1.45</td>
<td>9.48***</td>
<td>0.97</td>
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<tr>
<td>Objectivity&lt;sup&gt;i&lt;/sup&gt;</td>
<td>5.67</td>
<td>5.65</td>
<td>5.69</td>
<td>-0.25</td>
<td>0.03</td>
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<tr>
<td>Scientific impotence&lt;sup&gt;j&lt;/sup&gt;</td>
<td>4.33</td>
<td>4.66</td>
<td>3.98</td>
<td>3.13**</td>
<td>0.33</td>
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<tr>
<td>General support for science&lt;sup&gt;k&lt;/sup&gt;</td>
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<td>5.43</td>
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<td>Total amount donated to NSF&lt;sup&gt;l&lt;/sup&gt;</td>
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<td>(Donation to NSF/Total donation)&lt;sup&gt;m&lt;/sup&gt;</td>
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<td>0.00</td>
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<td>Religiosity&lt;sup&gt;n&lt;/sup&gt;</td>
<td>3.11</td>
<td>1.84</td>
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</tbody>
</table>

*Note. *<sup>p</sup> < .05. **<sup>p</sup> ≤ .01. ***<sup>p</sup> ≤ .001. Blank cells indicate that it did not make sense to compare participants who received belief-consistent and inconsistent evidence on this variable.

<sup>a</sup> Participants who received inconsistent evidence were non-religious participants in the religion-enhancing condition and religious participants in the religion-disparaging condition. Participants who received consistent evidence were non-religious participants in the religion-disparaging condition and religious participants in the religion-enhancing condition.

<sup>b</sup> Subjective bias=evaluations of the research quality. Scores on this measure ranged from 1 to 8, with higher numbers indicating more favorable research evaluations.

<sup>c</sup> Absolute bias (recall)=Deviation from the correct number of studies that favored the group indicated by the research (0=no bias, positive numbers=over-recalling a greater number of studies favoring the group indicated by the research, and negative numbers=under-recalling the number of studies favoring the group indicated by the research).

<sup>d</sup> Absolute bias (misrecall)=Number of studies misrecalled as favoring the opposite group than was shown by the research (0=correctly recalling that no studies favored this group, and positive numbers=misrecalling studies favoring this group).

<sup>e</sup> Belief (T2)=Belief about the relationship between religiosity and life outcomes after the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

<sup>f</sup> Belief in what research found=scores above 5 represent holding a stronger belief in the direction of what the research found (i.e., believing religiosity is more strongly associated with positive life outcomes for those in the religion-enhancing condition and more strongly associated with negative life outcomes for those in the religion-disparaging condition), and scores below 5 represent holding a stronger belief in the opposite direction of what the research found.
Indirect bias = self-reports of the extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1 = not at all, 7 = completely).

Defensiveness = extent to which participants felt defensive when reading about the research (1 = not at all, 7 = completely).

Objectivity = extent to which participants believed they made a concerted effort to remain objective when reading about the research (1 = not at all, 7 = completely).

Scientific impotence = belief that the question addressed by the research cannot be answered using scientific methods (1 = strongly disagree, 8 = strongly agree).

General support for science = overall support for/trust in scientific research (1 = not at all, 7 = completely).

Total amount donated to NSF = Dollar amount (out of $1.00) allocated to the NSF.

Donation to NSF/Total donation = Dollar amount (out of $1.00) allocated to NSF/Total amount of $1.00 donated to the NSF and the Save the Tiger Fund.

Religiosity = “I consider myself a religious individual” (1 = strongly disagree, 6 = strongly agree).
Table 10

**Correlations among measures (Study 4)**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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</thead>
<tbody>
<tr>
<td>1. Subjective bias&lt;sup&gt;a&lt;/sup&gt;</td>
<td>---</td>
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<td>2. Absolute bias (recall)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.07</td>
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<tr>
<td>3. Absolute bias (misrecall)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.12*</td>
<td>-0.57***</td>
<td>---</td>
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<td>4. Belief (T2)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.01</td>
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<td>---</td>
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<td>-0.01</td>
<td>-0.04</td>
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<td>0.04</td>
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<tr>
<td>6. Defensiveness&lt;sup&gt;f&lt;/sup&gt;</td>
<td>-0.36***</td>
<td>0.01</td>
<td>0.06</td>
<td>0.08</td>
<td>0.41***</td>
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<td>7. Objectivity&lt;sup&gt;g&lt;/sup&gt;</td>
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<td>0.08</td>
<td>-0.09</td>
<td>-0.02</td>
<td>-0.15**</td>
<td>-0.19***</td>
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<tr>
<td>8. Scientific impotence&lt;sup&gt;h&lt;/sup&gt;</td>
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<td>-0.06</td>
<td>0.15**</td>
<td>0.16**</td>
<td>0.04</td>
<td>0.17***</td>
<td>-0.07</td>
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<tr>
<td>9. General support for science&lt;sup&gt;i&lt;/sup&gt;</td>
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<td>0.00</td>
<td>-0.07</td>
<td>-0.25***</td>
<td>-0.04</td>
<td>-0.03</td>
<td>0.15**</td>
<td>-0.30***</td>
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<tr>
<td>10. Total amount donated to NSF&lt;sup&gt;j&lt;/sup&gt;</td>
<td>0.06</td>
<td>0.11*</td>
<td>-0.15**</td>
<td>-0.07</td>
<td>-0.03</td>
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<td>0.22***</td>
</tr>
<tr>
<td>11. (Donation to NSF/Total donation)&lt;sup&gt;k&lt;/sup&gt;</td>
<td>0.09</td>
<td>0.08</td>
<td>-0.07</td>
<td>-0.05</td>
<td>-0.02</td>
<td>-0.20***</td>
<td>0.07</td>
<td>-0.19***</td>
<td>0.18***</td>
</tr>
<tr>
<td>12. Religiosity&lt;sup&gt;l&lt;/sup&gt;</td>
<td>0.15**</td>
<td>0.07</td>
<td>0.07</td>
<td>0.53***</td>
<td>0.12*</td>
<td>0.01</td>
<td>0.02</td>
<td>0.19***</td>
<td>-0.30***</td>
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<table>
<thead>
<tr>
<th>10</th>
<th>11</th>
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</thead>
<tbody>
<tr>
<td>11. (Donation to NSF/Total donation)&lt;sup&gt;k&lt;/sup&gt;</td>
<td>0.99***</td>
</tr>
<tr>
<td>12. Religiosity&lt;sup&gt;l&lt;/sup&gt;</td>
<td>-0.15**</td>
</tr>
</tbody>
</table>

Note. *p < .05. **p ≤ .01. ***p ≤ .001.

<sup>a</sup> Subjective bias=evaluations of the research quality. Scores on this measure ranged from 1 to 8, with higher numbers indicating more favorable research evaluations.

<sup>b</sup> Absolute bias (recall)=Deviation from the correct number of studies that favored the group indicated by the research (0=no bias, positive numbers=over-recalling a greater number of studies favoring the group indicated by the research, and negative numbers=under-recalling the number of studies favoring the group indicated by the research).

<sup>c</sup> Absolute bias (misrecall)=Number of studies misrecalled as favoring the opposite group than was shown by the research (0=correctly recalling that no studies favored this group, and positive numbers=misrecalling studies favoring this group).

<sup>d</sup> Belief (T2)=Belief about the relationship between religiosity and life outcomes after the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).
Indirect bias= self-reports of the extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1= not at all, 7= completely).

Defensiveness= extent to which participants felt defensive when reading about the research (1= not at all, 7= completely).

Objectivity= extent to which participants believed they made a concerted effort to remain objective when reading about the research (1= not at all, 7= completely).

Scientific impotence= belief that the question addressed by the research cannot be answered using scientific methods (1= strongly disagree, 8= strongly agree).

General support for science= overall support for/trust in scientific research (1= not at all, 7= completely).

Total amount donated to NSF= Dollar amount (out of $1.00) allocated to the NSF.

Donation to NSF/Total donation= Dollar amount (out of $1.00) allocated to NSF/Total amount of $1.00 donated to the NSF and the Save the Tiger Fund.

Religiosity= “I consider myself a religious individual” (1= strongly disagree, 6= strongly agree).
Table 11

*Correspondence between Perceived Bias and Absolute Bias*

<table>
<thead>
<tr>
<th>Recall&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Study 4</th>
<th>Study 5</th>
<th>Study 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>B (SE)</td>
<td>t</td>
</tr>
<tr>
<td>Consistency&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.06</td>
<td>-0.08 (0.07)</td>
<td>-1.12</td>
</tr>
<tr>
<td>Indirect Bias&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-0.04</td>
<td>-0.02 (0.02)</td>
<td>-0.83</td>
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<tr>
<td>Interaction</td>
<td>0.12</td>
<td>0.02 (0.04)</td>
<td>0.67</td>
</tr>
<tr>
<td>Consistency&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.06</td>
<td>-0.08 (0.08)</td>
<td>-1.00</td>
</tr>
<tr>
<td>Direct Bias&lt;sup&gt;d&lt;/sup&gt;</td>
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<td></td>
<td></td>
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<tr>
<td>Interaction</td>
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<td></td>
</tr>
<tr>
<td>Consistency&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defensiveness&lt;sup&gt;e&lt;/sup&gt;</td>
<td>-0.01</td>
<td>-0.01 (0.02)</td>
<td>-0.22</td>
</tr>
<tr>
<td>Interaction&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.01</td>
<td>0.00 (0.05)</td>
<td>0.05</td>
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<tr>
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<td></td>
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<tr>
<td>Consistency&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.05</td>
<td>-0.07 (0.07)</td>
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<tr>
<td>Objectivity&lt;sup&gt;f&lt;/sup&gt;</td>
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<td>0.04 (0.03)</td>
<td>1.53</td>
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<tr>
<td>Interaction</td>
<td>-0.09</td>
<td>-0.02 (0.05)</td>
<td>-0.35</td>
</tr>
<tr>
<td>Consistency&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>Effort&lt;sup&gt;g&lt;/sup&gt;</td>
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<tr>
<td>Interaction</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Consistency&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Skepticism&lt;sup&gt;h&lt;/sup&gt;</td>
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<td>Interaction</td>
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<tr>
<td>Misrecall&lt;sup&gt;i&lt;/sup&gt;</td>
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<tr>
<td>Consistency&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>0.07 (0.08)</td>
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<td>Indirect Bias</td>
<td>Consistency</td>
<td>Direct Bias</td>
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<td>----------------------</td>
<td>---------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Interaction</td>
<td>0.04</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>0.02 (0.02)</td>
<td>0.01 (0.05)</td>
<td>0.02 (0.06)</td>
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<td>0.79</td>
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<td>-0.05 (1.17)</td>
<td>0.03</td>
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<td>0.47 (0.30)</td>
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<td>0.22</td>
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<td></td>
<td>1.57</td>
<td>-1.00</td>
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<tr>
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<td>0.00</td>
<td>0.01 (1.12)</td>
<td>0.02</td>
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<tr>
<td></td>
<td>0.01 (0.31)</td>
<td>0.07 (0.62)</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>0.02</td>
<td>1.08</td>
<td>0.01</td>
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</table>

*Note. *p < .05. **p ≤ .01. ***p ≤ .001. For each regression analysis, consistency and the assessment of bias measure (indirect bias, direct bias, defensiveness, objectivity, effort, or skepticism) were entered as predictors of absolute bias in Step 1, and the interaction was entered in Step 2. Simple slopes analyses are provided for all significant interactions. Blank cells indicate that analyses could not be conducted because the particular self-assessment of bias measure was not included in the study.

a Recall (Absolute bias)=Deviation from the correct number (Study 4) or percentage (Studies 5-6) of studies that favored the group indicated by the research (0=no bias, positive numbers=over-recalling a greater number of studies favoring the group indicated by the research, and negative numbers=under-recalling the number of studies favoring the group indicated by the research).
b The consistency variable was coded as 1=inconsistent, 2=consistent. Participants who received inconsistent evidence were non-religious participants in the religion-enhancing condition and religious participants in the religion-disparaging condition. Participants who received consistent evidence were non-religious participants in the religion-disparaging condition and religious participants in the religion-enhancing condition.
c Indirect bias=extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1=not at all, 7=completely).
d Direct bias=extent to which participants believed they were biased in evaluating the research (1=not at all, 7=completely).
e Defensiveness=extent to which participants felt defensive when reading about the research (1=not at all, 7=completely).
f Objectivity=extent to which participants believed they made a concerted effort to remain objective when reading about the research (1=not at all, 7=completely).
Effort=perceived effort exerted critiquing the research (1=no effort, 7=strong effort).
Skepticism=perceived skepticism of the research (1=not at all, 7=extremely).
Misrecall (Absolute bias)=Number (Study 4) or percentage (Studies 5-6) of studies misrecalled as favoring the opposite group than was shown by the research (0=correctly recalling that no studies favored this group, and positive numbers=misrecalling studies favoring this group).
Table 12

Correspondence between Perceived Bias and Belief Change

<table>
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<tr>
<th>Belief Change</th>
<th>Study 4</th>
<th>Study 5</th>
<th>Study 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>B (SE)</td>
<td>t</td>
</tr>
<tr>
<td>Consistency</td>
<td>0.50</td>
<td>2.38 (0.31)</td>
<td>7.62***</td>
</tr>
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<td>Indirect Bias</td>
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<td>-0.03 (0.08)</td>
<td>0.71</td>
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<td>Interaction</td>
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<td>0.45 (0.15)</td>
<td>2.95**</td>
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<td>Inconsistent</td>
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<td>-0.25 (0.12)</td>
<td>-2.06*</td>
</tr>
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<td>0.20 (0.09)</td>
<td>2.11*</td>
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<td>Consistency</td>
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<td>-0.08 (0.17)</td>
<td>-0.50</td>
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<td>Direct Bias</td>
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<td>-0.04 (0.05)</td>
<td>-0.85</td>
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<td>-0.19 (0.10)</td>
<td>-1.91</td>
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<td>Consistency</td>
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<td>1.81 (0.34)</td>
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</tr>
<tr>
<td>Interaction</td>
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<td>-0.11 (0.34)</td>
<td>-0.31</td>
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<td>2.41 (0.30)</td>
<td>7.97***</td>
</tr>
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<td>Objectivity</td>
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<td>-0.03 (0.12)</td>
<td>-0.27</td>
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<td>Interaction</td>
<td>0.46</td>
<td>0.30 (0.23)</td>
<td>1.28</td>
</tr>
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<td>Consistency</td>
<td>-0.06</td>
<td>-0.22 (0.18)</td>
<td>-0.22</td>
</tr>
<tr>
<td>Effort</td>
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<td>-0.01 (0.06)</td>
<td>-0.18</td>
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<td>Interaction</td>
<td>-0.28</td>
<td>-0.13 (0.12)</td>
<td>-1.17</td>
</tr>
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<td>Consistency</td>
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<td>-0.31 (0.19)</td>
<td>-1.58</td>
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<td>Skepticism</td>
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<td>-0.06 (0.05)</td>
<td>-1.16</td>
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<tr>
<td>Interaction</td>
<td>0.18</td>
<td>0.11 (0.11)</td>
<td>0.98</td>
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</table>

Note. *p < .05. **p ≤ .01. ***p ≤ .001. For each regression analysis, consistency and the assessment of bias measure (indirect bias, direct bias, defensiveness, objectivity, effort, or skepticism) were entered as predictors of belief change in Step 1, and the interaction was entered in Step 2. Simple slopes analyses are provided for all significant interactions. Blank cells indicate that analyses could not be conducted because the particular self-assessment of bias measure was not included in the study.

a Belief change=higher scores represent holding a stronger belief in the direction of what the research found (i.e., believing religiosity is more strongly associated with positive life outcomes for those in the religion-enhancing condition and more strongly associated with negative life outcomes for those in the religion-disparaging condition). In Study 4, belief change was assessed only after the manipulation. In Studies 5 and 6, belief change was assessed by subtracting participants’ beliefs at T1 from their beliefs at T2 (these variables were first recoded for those in the religion-disparaging condition).
The consistency variable was coded as 1=inconsistent, 2=consistent. Participants who received inconsistent evidence were non-religious participants in the religion-enhancing condition and religious participants in the religion-disparaging condition. Participants who received consistent evidence were non-religious participants in the religion-disparaging condition and religious participants in the religion-enhancing condition.

Indirect bias=extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1=not at all, 7=completely).

Direct bias=extent to which participants believed they were biased in evaluating the research (1=not at all, 7=completely).

Defensiveness=extent to which participants felt defensive when reading about the research (1=not at all, 7=completely).

Objectivity=extent to which participants believed they made a concerted effort to remain objective when reading about the research (1=not at all, 7=completely).

Effort=perceived effort exerted critiquing the research (1=no effort, 7=strong effort).

Skepticism=perceived skepticism of the research (1=not at all, 7=extremely).
Table 13

Behavioral Support for Science: Letter to Representative (Study 4)

**Forced-Choice Question**

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<th></th>
<th>Would like to advocate for increased funding for social science research</th>
<th>Do not wish to advocate for increased funding for social science research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inconsistent Evidence</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Consistent Evidence</td>
<td>104</td>
<td>90</td>
</tr>
</tbody>
</table>

$\chi^2(1, 374) = 0.49, p = 0.49.$

**Forced-Choice Question**

<table>
<thead>
<tr>
<th></th>
<th>Would like to advocate for increased funding for social science research</th>
<th>Do not wish to advocate for increased funding for social science research</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-religious Ps</td>
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</tr>
<tr>
<td>Religion-Disparaging</td>
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<td>Religion-Enhancing</td>
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<td>Religious Ps</td>
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<td>Religion-Enhancing</td>
<td>37</td>
<td>56</td>
<td></td>
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</table>

**Signed Letter**

<table>
<thead>
<tr>
<th></th>
<th>Signed Letter to Representative</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Inconsistent Evidence</td>
<td>94</td>
<td>86</td>
</tr>
<tr>
<td>Consistent Evidence</td>
<td>109</td>
<td>83</td>
</tr>
</tbody>
</table>

$\chi^2(1, 372) = 0.78, p = 0.38.$

**Signed Letter**

<table>
<thead>
<tr>
<th></th>
<th>Signed Letter to Representative</th>
<th>Did Not Sign Letter</th>
<th>$\chi^2$</th>
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<tbody>
<tr>
<td>Non-religious Ps</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Religion-Disparaging</td>
<td>66</td>
<td>33</td>
<td>0.58</td>
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<td>Religion-Enhancing</td>
<td>59</td>
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<tr>
<td>Religious Ps</td>
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<td>Religion-Disparaging</td>
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<td>43</td>
<td>50</td>
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</table>
### Table 14

**Descriptive Statistics (Study 5)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall</th>
<th>Inconsistent&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Consistent&lt;sup&gt;a&lt;/sup&gt;</th>
<th>t</th>
<th>d</th>
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<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
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</tr>
<tr>
<td>Subjective bias (evaluations)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.75</td>
<td>1.85</td>
<td>3.91</td>
<td>1.65</td>
<td>-10.17***</td>
</tr>
<tr>
<td>Absolute bias (recall)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4.13</td>
<td>12.60</td>
<td>3.72</td>
<td>13.80</td>
<td>-0.70</td>
</tr>
<tr>
<td></td>
<td>3.73</td>
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<td>3.97</td>
<td>13.61</td>
<td>0.34</td>
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<tr>
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<td>3.81</td>
<td>18.28</td>
<td>-1.35</td>
</tr>
<tr>
<td>Generated percentage&lt;sup&gt;e&lt;/sup&gt;</td>
<td>5.26</td>
<td>11.21</td>
<td>5.77</td>
<td>12.67</td>
<td>1.04</td>
</tr>
<tr>
<td>Absolute bias (misrecall)&lt;sup&gt;f&lt;/sup&gt;</td>
<td>4.65</td>
<td>11.34</td>
<td>4.54</td>
<td>11.95</td>
<td>-0.06</td>
</tr>
<tr>
<td>Calculated percentage&lt;sup&gt;d&lt;/sup&gt;</td>
<td>5.87</td>
<td>14.64</td>
<td>6.71</td>
<td>17.15</td>
<td>1.31</td>
</tr>
<tr>
<td>Generated percentage&lt;sup&gt;e&lt;/sup&gt;</td>
<td>5.93</td>
<td>1.92</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Belief (T1)&lt;sup&gt;g&lt;/sup&gt;</td>
<td>5.76</td>
<td>2.24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief recall at T2&lt;sup&gt;i&lt;/sup&gt;</td>
<td>5.86</td>
<td>1.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief change&lt;sup&gt;j&lt;/sup&gt;</td>
<td>0.82</td>
<td>1.66</td>
<td>0.85</td>
<td>1.81</td>
<td>0.79</td>
</tr>
<tr>
<td>Indirect bias&lt;sup&gt;k&lt;/sup&gt;</td>
<td>3.46</td>
<td>1.92</td>
<td>3.66</td>
<td>1.92</td>
<td>3.27</td>
</tr>
<tr>
<td>Direct bias&lt;sup+l&lt;/sup&gt;</td>
<td>2.76</td>
<td>1.64</td>
<td>3.01</td>
<td>1.69</td>
<td>2.52</td>
</tr>
<tr>
<td>Defensiveness&lt;sup&gt;m&lt;/sup&gt;</td>
<td>2.12</td>
<td>1.61</td>
<td>2.66</td>
<td>1.74</td>
<td>1.59</td>
</tr>
<tr>
<td>Objectivity&lt;sup&gt;n&lt;/sup&gt;</td>
<td>5.88</td>
<td>1.19</td>
<td>5.77</td>
<td>1.19</td>
<td>6.00</td>
</tr>
<tr>
<td>Scientific impotence&lt;sup:o&lt;/sup&gt;</td>
<td>4.32</td>
<td>2.13</td>
<td>4.86</td>
<td>2.02</td>
<td>3.80</td>
</tr>
<tr>
<td>General support for science&lt;sup&gt;p&lt;/sup&gt;</td>
<td>5.48</td>
<td>0.91</td>
<td>5.36</td>
<td>0.96</td>
<td>5.59</td>
</tr>
<tr>
<td>Religiosity&lt;sup&gt;q&lt;/sup&gt;</td>
<td>3.16</td>
<td>1.86</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** *p < .05. **p < .01. ***p < .001. Blank cells indicate that it did not make sense to compare participants who received belief-consistent and inconsistent evidence on this variable.

<sup>a</sup> Participants who received inconsistent evidence were non-religious participants in the religion-enhancing condition and religious participants in the religion-disparaging condition. Participants who received consistent evidence were non-religious participants in the religion-disparaging condition and religious participants in the religion-enhancing condition.

<sup>b</sup> Subjective bias=evaluations of the research quality. Scores on this measure ranged from 1 to 8, with higher numbers indicating more favorable research evaluations.

<sup>c</sup> Absolute bias (recall)=Deviation from the correct percentage of studies that favored the group indicated by the research (0=no bias, positive numbers=over-recalling a greater percentage of studies favoring the group indicated by the research, and negative numbers=under-recalling the percentage of studies favoring the group indicated by the research).

<sup>d</sup> Calculated percentage=Number of studies participants reported favoring the target group / total number of studies participants believed they read.

<sup>e</sup> Generated percentage=Percentage of studies participants estimated that favored the target group.
Absolute bias (misrecall)=Percentage of studies misrecalled as favoring the opposite group than was shown by the research (0=correctly recalling that no studies favored this group, and positive numbers=misrecalling studies favoring this group).

Belief (T1)=Belief about the relationship between religiosity and life outcomes at the beginning of the study, before the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Belief (T2)=Belief about the relationship between religiosity and life outcomes after the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Belief recall at T2=How participants thought they believed religiosity was related to life outcomes at the beginning of the study, before the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Belief change=higher scores represent holding a stronger belief in the direction of what the research found at T2 vs. T1 (i.e., believing religiosity is more strongly associated with positive life outcomes for those in the religion-enhancing condition and more strongly associated with negative life outcomes for those in the religion-disparaging condition).

Indirect bias=extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1=not at all, 7=completely).

Direct bias=extent to which participants believed they were biased in evaluating the research (1=not at all, 7=completely).

Defensiveness=extent to which participants felt defensive when reading about the research (1=not at all, 7=completely).

Objectivity=extent to which participants believed they made a concerted effort to remain objective when reading about the research (1=not at all, 7=completely).

Scientific impotence=belief that the question addressed by the research cannot be answered using scientific methods (1=strongly disagree, 8=strongly agree).

General support for science=overall support for/trust in scientific research (1=not at all, 7=completely).

Religiosity=“I consider myself a religious individual” (1=strongly disagree, 6=strongly agree).
Table 15

_Correlations among measures (Study 5)_

<table>
<thead>
<tr>
<th>1. Subjective Bias&lt;sup&gt;a&lt;/sup&gt;</th>
<th>2. Absolute bias (recall)&lt;sup&gt;b&lt;/sup&gt;</th>
<th>3. Absolute bias (misrecall)&lt;sup&gt;c&lt;/sup&gt;</th>
<th>4. Belief (T1)&lt;sup&gt;d&lt;/sup&gt;</th>
<th>5. Belief (T2)&lt;sup&gt;e&lt;/sup&gt;</th>
<th>6. Belief recall&lt;sup&gt;f&lt;/sup&gt;</th>
<th>7. Belief change&lt;sup&gt;g&lt;/sup&gt;</th>
<th>8. Indirect bias&lt;sup&gt;h&lt;/sup&gt;</th>
<th>9. Direct bias&lt;sup&gt;i&lt;/sup&gt;</th>
<th>10. Defensiveness&lt;sup&gt;j&lt;/sup&gt;</th>
<th>11. Objectivity&lt;sup&gt;k&lt;/sup&gt;</th>
<th>12. Scientific impotence&lt;sup&gt;l&lt;/sup&gt;</th>
<th>13. General support for science&lt;sup&gt;m&lt;/sup&gt;</th>
<th>14. Religiosity&lt;sup&gt;n&lt;/sup&gt;</th>
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</thead>
<tbody>
<tr>
<td>1. Subjective Bias&lt;sup&gt;a&lt;/sup&gt;</td>
<td>---</td>
<td>0.03</td>
<td>0.09</td>
<td>0.00</td>
<td>0.09</td>
<td>0.24***</td>
<td>0.03</td>
<td>-0.16***</td>
<td>-0.40***</td>
<td>0.16**</td>
<td>-0.28***</td>
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<td>0.07</td>
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<td>0.15**</td>
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<td>0.15**</td>
<td>-0.11*</td>
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<td>-0.07</td>
<td>-0.02</td>
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<td>6. Belief recall&lt;sup&gt;f&lt;/sup&gt;</td>
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<td>0.05</td>
<td>0.05</td>
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<td>-0.01</td>
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<td>-0.01</td>
<td>-0.07</td>
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<td>-0.02</td>
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<td>-0.07</td>
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<td>-0.01</td>
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<td>0.09</td>
<td>0.15**</td>
<td>0.16**</td>
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<td>9. Direct bias&lt;sup&gt;i&lt;/sup&gt;</td>
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<td>-0.03</td>
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<td>0.03</td>
<td>0.03</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.07</td>
<td>-0.01</td>
<td>-0.04</td>
<td>-0.01</td>
<td>-0.04</td>
</tr>
<tr>
<td>10. Defensiveness&lt;sup&gt;j&lt;/sup&gt;</td>
<td>-0.40***</td>
<td>0.02</td>
<td>0.05</td>
<td>-0.03</td>
<td>-0.01</td>
<td>-0.07</td>
<td>-0.02</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>11. Objectivity&lt;sup&gt;k&lt;/sup&gt;</td>
<td>0.16**</td>
<td>0.00</td>
<td>-0.04</td>
<td>-0.01</td>
<td>0.01</td>
<td>0.04</td>
<td>0.12*</td>
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<td>---</td>
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<tr>
<td>12. Scientific impotence&lt;sup&gt;l&lt;/sup&gt;</td>
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<td>0.09</td>
<td>0.02</td>
<td>0.13**</td>
<td>0.15**</td>
<td>-0.11*</td>
<td>-0.08</td>
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</tr>
<tr>
<td>13. General support for science&lt;sup&gt;m&lt;/sup&gt;</td>
<td>-0.24***</td>
<td>-0.01</td>
<td>-0.05</td>
<td>-0.21***</td>
<td>-0.22***</td>
<td>-0.21***</td>
<td>0.12*</td>
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<td>---</td>
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<td>---</td>
<td>---</td>
</tr>
<tr>
<td>14. Religiosity&lt;sup&gt;n&lt;/sup&gt;</td>
<td>0.12*</td>
<td>-0.02</td>
<td>0.07</td>
<td>0.66***</td>
<td>0.59***</td>
<td>0.66***</td>
<td>0.00</td>
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<td>---</td>
<td>---</td>
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<td>---</td>
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</tr>
</tbody>
</table>

| 8. Indirect bias<sup>h</sup> | ---                             | ---                             | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      |
| 9. Direct bias<sup>i</sup> | 0.50***                         | ---                             | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      |
| 10. Defensiveness<sup>j</sup> | 0.31***                         | 0.45***                         | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      |
| 11. Objectivity<sup>k</sup> | -0.12*                          | -0.36***                        | -0.20***                 | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      |
| 12. Scientific impotence<sup>l</sup> | 0.00                             | 0.03                             | 0.15**                   | -0.13*                   | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      |
| 13. General support for science<sup>m</sup> | -0.12*                          | -0.13*                          | -0.17***                 | 0.20***                  | -0.32***                 | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      |
| 14. Religiosity<sup>n</sup> | 0.20***                         | 0.02                             | 0.02                     | 0.06                     | 0.11*                   | -0.20***                 | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      | ---                      |

_Note._ *p < .05. **p ≤ .01. ***p ≤ .001.

<sup>a</sup>Subjective bias=evaluations of the research quality. Scores on this measure ranged from 1 to 8, with higher numbers indicating more favorable research evaluations.
Absolute bias (recall)=Deviation from the correct percentage of studies that favored the group indicated by the research (0=no bias, positive numbers=over-recalling a greater percentage of studies favoring the group indicated by the research, and negative numbers=under-recalling the percentage of studies favoring the group indicated by the research).

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Belief recall at T2=How participants thought they believed religiosity was related to life outcomes at the beginning of the study, before the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Belief change= higher scores represent holding a stronger belief in the direction of what the research found at T2 vs. T1 (i.e., believing religiosity is more strongly associated with positive life outcomes for those in the religion-enhancing condition and more strongly associated with negative life outcomes for those in the religion-disparaging condition).

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Scientific impotence=belief that the question addressed by the research cannot be answered using scientific methods (1=strongly disagree, 8=strongly agree).

General support for science= overall support for/trust in scientific research (1=not at all, 7=completely).

Religiosity="I consider myself a religious individual" (1=strongly disagree, 6=strongly agree).
Table 16

Descriptive Statistics (Study 6)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall</th>
<th>Inconsistent(^a)</th>
<th>Consistent(^a)</th>
<th>t</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Subjective bias (evaluations)(^b)</td>
<td>4.98</td>
<td>1.77</td>
<td>4.03</td>
<td>1.65</td>
<td>-11.06***</td>
</tr>
<tr>
<td>Absolute bias (recall)(^c)</td>
<td>3.75</td>
<td>12.28</td>
<td>3.51</td>
<td>12.21</td>
<td>-0.32</td>
</tr>
<tr>
<td>Calculated percentage(^d)</td>
<td>3.21</td>
<td>13.82</td>
<td>2.27</td>
<td>15.09</td>
<td>0.27</td>
</tr>
<tr>
<td>Generated percentage(^e)</td>
<td>4.89</td>
<td>14.12</td>
<td>5.10</td>
<td>13.18</td>
<td>0.39</td>
</tr>
<tr>
<td>Absolute bias (misrecall)(^f)</td>
<td>4.88</td>
<td>10.32</td>
<td>4.88</td>
<td>10.45</td>
<td>-0.05</td>
</tr>
<tr>
<td>Calculated percentage(^d)</td>
<td>4.46</td>
<td>10.14</td>
<td>4.63</td>
<td>10.19</td>
<td>0.82</td>
</tr>
<tr>
<td>Generated percentage(^e)</td>
<td>5.56</td>
<td>12.93</td>
<td>5.49</td>
<td>12.53</td>
<td>-0.13</td>
</tr>
<tr>
<td>Belief (T1)(^g)</td>
<td>6.01</td>
<td>1.97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief (T2)(^h)</td>
<td>5.87</td>
<td>2.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief recall at T2(^i)</td>
<td>5.86</td>
<td>1.99</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief change(^j)</td>
<td>0.63</td>
<td>1.74</td>
<td>0.75</td>
<td>1.80</td>
<td>1.23</td>
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<tr>
<td>Expected indirect bias (T1)(^k)</td>
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<td>Perceived effort critiquing research (T2)*</td>
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<td>Scientific impotencex</td>
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<td>Religiosityz</td>
<td>3.31</td>
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</table>

Note. *p < .05. **p ≤ .01. ***p ≤ .001. Blank cells indicate that it did not make sense to compare participants who received belief-consistent and inconsistent evidence on this variable.

*Participants who received inconsistent evidence were non-religious participants in the religion-enhancing condition and religious participants in the religion-disparaging condition. Participants who received consistent evidence were non-religious participants in the religion-disparaging condition and religious participants in the religion-enhancing condition.

**Subjective bias=evaluations of the research quality. Scores on this measure ranged from 1 to 8, with higher numbers indicating more favorable research evaluations.

Absolute bias (recall)=Deviation from the correct percentage of studies that favored the group indicated by the research (0=no bias, positive numbers=over-recalling a greater percentage of studies favoring the group indicated by the research, and negative numbers=under-recalling the percentage of studies favoring the group indicated by the research).

Generated percentage=Percentage of studies participants estimated that favored the target group.

Absolute bias (misrecall)=Percentage of studies misrecalled as favoring the opposite group than was shown by the research (0=correctly recalling that no studies favored this group, and positive numbers=misrecalling studies favoring this group).

Belief (T1)=Belief about the relationship between religiosity and life outcomes at the beginning of the study, before the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Belief (T2)=Belief about the relationship between religiosity and life outcomes after the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Belief recall at T2=How participants thought they believed religiosity was related to life outcomes at the beginning of the study, before the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Belief change=higher scores represent holding a stronger belief in the direction of what the research found at T2 vs. T1 (i.e., believing religiosity is more strongly associated with positive life outcomes for those in the religion-enhancing condition and more strongly associated with negative life outcomes for those in the religion-disparaging condition).

Expected indirect bias (T1)=extent to which participants expected their evaluations of the research to be influenced by their pre-existing views (1=not at all, 7=completely).

Expected direct bias (T1)=extent to which participants expected to be biased when evaluating the research (1=not at all, 7=completely).

Expected defensiveness in response to belief-inconsistent evidence (T1)=extent to which participants expected to feel defensive in response to belief-inconsistent evidence (1=not at all, 7=completely).

Expected defensiveness in response to belief-consistent evidence (T1)=extent to which participants expected to feel defensive in response to belief-consistent evidence (1=not at all, 7=completely).

Expected effort critiquing belief-inconsistent evidence (T1)=extent to which participants expected to exert effort critiquing belief-inconsistent evidence (1=no effort, 7=strong effort).
Expected effort critiquing belief-consistent evidence (T1)= extent to which participants expected to exert effort critiquing belief-consistent evidence (1=no effort, 7=strong effort).

Expected skepticism in response to belief-inconsistent evidence (T1)=extent to which participants expected to be skeptical of belief-inconsistent evidence (1=not at all, 7=extremely).

Expected skepticism in response to belief-consistent evidence (T1)=extent to which participants expected to be skeptical of belief-consistent evidence (1=not at all, 7=extremely).

Perceived indirect bias (T2)=extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1=not at all, 7=completely).

Perceived direct bias (T2)=extent to which participants believed they were biased in evaluating the research (1=not at all, 7=completely).

Perceived defensiveness (T2)=extent to which participants felt defensive when reading about the research (1=not at all, 7=completely).

Perceived effort critiquing (T2)=extent to which participants believed they exerted effort critiquing the research (1=no effort, 7=strong effort).

Scientific impotence (T2)=belief that the question addressed by the research cannot be answered using scientific methods (1=strongly disagree, 8=strongly agree).

General support for science (T2)=overall support for/trust in scientific research (1=not at all, 7=completely).

Religiosity (T2)=“I consider myself a religious individual” (1=strongly disagree, 6=strongly agree).
Table 17

**Correlations among primary measures (Study 6)**

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<td>-0.02</td>
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<td>-0.02</td>
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<td>15. Religiosity</td>
<td>0.16***</td>
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<td>0.66***</td>
<td>0.58***</td>
<td>0.61***</td>
<td>-0.04</td>
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*Note. *p < .05. **p ≤ .01. ***p ≤ .001.

Subjective bias=evaluations of the research quality. Scores on this measure ranged from 1 to 8, with higher numbers indicating more favorable research evaluations.
Absolute bias (recall)=Deviation from the correct percentage of studies that favored the group indicated by the research (0=no bias, positive numbers=over-recalling a greater percentage of studies favoring the group indicated by the research, and negative numbers=under-recalling the percentage of studies favoring the group indicated by the research).

Absolute bias (misrecall)=Percentage of studies misrecalled as favoring the opposite group than was shown by the research (0=correctly recalling that no studies favored this group, and positive numbers=misrecalling studies favoring this group).

Belief (T1)=Belief about the relationship between religiosity and life outcomes at the beginning of the study, before the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Belief (T2)=Belief about the relationship between religiosity and life outcomes after the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Belief recall at T2=How participants thought they believed religiosity was related to life outcomes at the beginning of the study, before the manipulation (1=strongly related to negative outcomes, 9=strongly related to positive outcomes).

Belief change= higher scores represent holding a stronger belief in the direction of what the research found at T2 vs. T1 (i.e., believing religiosity is more strongly associated with positive life outcomes for those in the religion-enhancing condition and more strongly associated with negative life outcomes for those in the religion-disparaging condition).

Perceived indirect bias=extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1=not at all, 7=completely).

Perceived direct bias=extent to which participants believed they were biased in evaluating the research (1=not at all, 7=completely).

Perceived defensiveness=extent to which participants felt defensive when reading about the research (1=not at all, 7=completely).

Perceived effort critiquing=extent to which participants believed they exerted effort critiquing the research (1=no effort, 7=strong effort).

Perceived skepticism=extent to which participants believed they were skeptical of the research (1=not at all, 7=extremely).

Scientific impotence=belief that the question addressed by the research cannot be answered using scientific methods (1=strongly disagree, 8=strongly agree).

General support for science= overall support for/trust in scientific research (1=not at all, 7=completely).

Religiosity="I consider myself a religious individual" (1=strongly disagree, 6=strongly agree).
Table 18

*Correlations among pre-assessment of bias measures (Study 6)*

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<td>2. Expected direct bias(^b)</td>
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<tr>
<td>5. Expected skepticism (inconsistent)(^e)</td>
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<td>0.35***</td>
<td>0.64***</td>
<td>0.31***</td>
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<td>6. Expected defensiveness (consistent)(^f)</td>
<td>0.23***</td>
<td>0.22***</td>
<td>0.49***</td>
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<tr>
<td>7. Expected effort critiquing (consistent)(^g)</td>
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<td>8. Expected skepticism (consistent)(^h)</td>
<td>0.07</td>
<td>0.10*</td>
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<td>0.07</td>
<td>0.29***</td>
<td>0.47***</td>
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</table>

*Note.* \(^*\)p < .05. **p \(\leq .01.***p \(\leq .001.

\(^a\) Expected indirect bias=extent to which participants expected their evaluations of the research to be influenced by their pre-existing views (1=not at all, 7=completely).

\(^b\) Expected direct bias=extent to which participants expected to be biased when evaluating the research (1=not at all, 7=completely).

\(^c\) Expected defensiveness (inconsistent)=extent to which participants expected to feel defensive in response to belief-inconsistent evidence (1=not at all, 7=completely).

\(^d\) Expected effort critiquing belief-inconsistent evidence=extent to which participants expected to exert effort critiquing belief-inconsistent evidence (1=no effort, 7=strong effort).

\(^e\) Expected skepticism in response to belief-inconsistent evidence=extent to which participants expected to be skeptical of belief-inconsistent evidence (1=not at all, 7=extremely).

\(^f\) Expected defensiveness in response to belief-consistent evidence=extent to which participants expected to feel defensive in response to belief-consistent evidence (1=not at all, 7=completely).

\(^g\) Expected effort critiquing belief-consistent evidence=extent to which participants expected to exert effort critiquing belief-consistent evidence (1=no effort, 7=strong effort).

\(^h\) Expected skepticism in response to belief-consistent evidence=extent to which participants expected to be skeptical of belief-consistent evidence (1=not at all, 7=extremely).
Table 19

Correlations among pre- and post-assessment of bias measures (Study 6)

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<td>0.34***</td>
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</tr>
<tr>
<td>7. Expected effort\textsuperscript{g}</td>
<td>0.19***</td>
<td>0.07</td>
<td>0.07</td>
<td>0.06</td>
<td>0.22***</td>
<td>0.13*</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Perceived effort\textsuperscript{h}</td>
<td>0.02</td>
<td>-0.03</td>
<td>-0.08</td>
<td>-0.07</td>
<td>0.07</td>
<td>0.02</td>
<td>0.40***</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>9. Expected skepticism\textsuperscript{i}</td>
<td>0.14**</td>
<td>0.08</td>
<td>0.18***</td>
<td>0.19***</td>
<td>0.58***</td>
<td>0.36***</td>
<td>0.27***</td>
<td>0.04</td>
<td>---</td>
</tr>
<tr>
<td>10. Perceived skepticism\textsuperscript{j}</td>
<td>0.14**</td>
<td>0.13***</td>
<td>0.11*</td>
<td>0.29***</td>
<td>0.20***</td>
<td>0.47***</td>
<td>0.04</td>
<td>0.01</td>
<td>0.30***</td>
</tr>
</tbody>
</table>

*Note. \textsuperscript{a}*p < .05. **p ≤ .01. ***p ≤ .001. For these correlations, pre-manipulation responses to the inconsistent defensiveness, effort critiquing, and skepticism items were used for participants who were subsequently presented with belief-inconsistent evidence, and pre-manipulation responses to the consistent items were used for participants subsequently presented with belief-consistent evidence.

\textsuperscript{a}Expected indirect bias=extent to which participants expected their evaluations of the research to be influenced by their pre-existing views (1=not at all, 7=completely).

\textsuperscript{b}Perceived indirect bias=extent to which participants believed their evaluations of the research were influenced by their pre-existing views (1=not at all, 7=completely).

\textsuperscript{c}Expected direct bias=extent to which participants expected to be biased when evaluating the research (1=not at all, 7=completely).

\textsuperscript{d}Perceived direct bias=extent to which participants believed they were biased in evaluating the research (1=not at all, 7=completely).

\textsuperscript{e}Expected defensiveness=extent to which participants expected to feel defensive when reading about the particular type (belief-consistent or belief-inconsistent) of research (1=not at all, 7=completely).

\textsuperscript{f}Perceived defensiveness=extent to which participants felt defensive when reading about the research (1=not at all, 7=completely).

\textsuperscript{g}Expected effort=extent to which participants expected to exert effort critiquing the particular type (belief-consistent or belief-inconsistent) of research (1=no effort, 7=strong effort).
Perceived effort = extent to which participants believed they exerted effort critiquing the research (1=no effort, 7=strong effort).

Expected skepticism = extent to which participants expected to be skeptical of the particular type (belief-consistent or belief-inconsistent) of research (1=not at all, 7=extremely)

Perceived skepticism = extent to which participants believed they were skeptical of the research (1=not at all, 7=extremely).
Table 20

Bias vs. Accuracy: To what extent are people biased in evaluating, recalling, and maintaining (vs. changing) their beliefs in response to belief-relevant evidence?

(a) Bias vs. accuracy: General conclusions

<table>
<thead>
<tr>
<th>Study 2</th>
<th>Study 3 (Religiosity)</th>
<th>Study 3 (Political)</th>
<th>Study 4</th>
<th>Study 5</th>
<th>Study 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective bias</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Absolute bias</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Belief change</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note. Yes/no judgments for subjective and absolute bias were made based on the significance of the t-tests comparing responses between those who received belief-consistent and inconsistent evidence. Because Study 4 only measured beliefs at the end of the study, belief change was determined by the significance of the main effect for research findings in ANOVAs comparing participants’ beliefs reported at the end of the study as a function of research findings and religious orientation. In Studies 5 and 6, belief change was assessed by the significance of the interaction between research findings and time of assessment (pre vs. post-manipulation) in the ANOVAs comparing beliefs as a function of research findings, religious orientation, and time of assessment.

(b) Bias vs. accuracy: Effect sizes across studies

<table>
<thead>
<tr>
<th>Study 2</th>
<th>Study 3 (Religiosity)</th>
<th>Study 3 (Political)</th>
<th>Study 4</th>
<th>Study 5</th>
<th>Study 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective bias</td>
<td>$d=0.93$</td>
<td>$d=0.87$</td>
<td>$d=0.98$</td>
<td>$d=1.09$</td>
<td>$d=1.03$</td>
</tr>
<tr>
<td>Absolute bias</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recall</td>
<td>$d=0.12^\dagger$</td>
<td>$d=0.07$</td>
<td>$d=0.04^\dagger$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Misrecall</td>
<td>$d=0.08^\dagger$</td>
<td>$d=0.11$</td>
<td>$d=0.01^\dagger$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief change</td>
<td>$d=0.26$</td>
<td>$d=0.22$</td>
<td>$d=0.14$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Effect sizes for subjective and absolute bias were calculated from the results of the t-tests comparing responses between those who received belief-consistent and inconsistent evidence. Study 4 only measured participants’ beliefs at the end of the study. Therefore, for ease of comparison, the effect size for belief change in each study was calculated from the main effect for research findings in ANOVAs comparing participants’ beliefs reported at the end of the study as a function of research findings and religious orientation.

$^\dagger$Observed pattern of means was in the opposite direction as would be expected if absolute bias was present.
Table 21

**Awareness of bias: When evaluating belief-relevant evidence, to what extent are people aware of their bias? Are there circumstances under which people are more or less aware of their bias?**

**Awareness of bias: General conclusions**

<table>
<thead>
<tr>
<th>Study</th>
<th>Study 1</th>
<th>Study 2</th>
<th>Study 3</th>
<th>Study 4</th>
<th>Study 5</th>
<th>Study 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>General susceptibility to bias</td>
<td>Somewhat to moderately aware</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Somewhat to moderately aware</td>
</tr>
<tr>
<td>Bias in specific instances</td>
<td></td>
<td>Slightly to somewhat aware</td>
<td>Slightly to somewhat aware</td>
<td>Slightly to somewhat aware</td>
<td>Slightly to somewhat aware</td>
<td>Slightly to somewhat aware</td>
</tr>
<tr>
<td>Awareness of the affective and cognitive processes that define biased information processing</td>
<td>Some awareness: Defensiveness Threatened Ignore, discredit, and challenge inconsistent evidence</td>
<td>Some awareness: Defensiveness</td>
<td>Some awareness: Defensiveness</td>
<td>Some awareness: Defensiveness</td>
<td>Some awareness: Defensiveness</td>
<td>Some awareness: Defensiveness Skepticism (Not: effort critiquing)</td>
</tr>
<tr>
<td>Awareness of own vs. others’ bias</td>
<td>Others more biased than self</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectations for bias vs. perceptions of bias</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Believe less biased than expected</td>
</tr>
<tr>
<td>Indirect vs. direct assessment of bias</td>
<td></td>
<td></td>
<td></td>
<td>Greater admission on indirect measure</td>
<td>Greater admission on indirect measure</td>
<td></td>
</tr>
<tr>
<td>Assessment of bias when presented with belief-inconsistent vs. consistent evidence</td>
<td>No difference</td>
<td>Greater admission for inconsistent evidence</td>
<td>Greater admission for inconsistent evidence</td>
<td>Greater admission for inconsistent evidence</td>
<td>Greater admission for inconsistent evidence</td>
<td>No difference</td>
</tr>
<tr>
<td>Assessment of bias after explicitly evaluating research vs. before</td>
<td></td>
<td>Greater admission after explicitly evaluating research</td>
<td>Greater admission after explicitly evaluating research</td>
<td>Greater admission after explicitly evaluating research</td>
<td>Greater admission after explicitly evaluating research</td>
<td>Greater admission after explicitly evaluating research</td>
</tr>
<tr>
<td>Correspondence of self-reported bias with actual measures of bias</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Subjective bias</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Absolute bias</td>
<td></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief change</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* With the exception of awareness of the processes that define biased information processing, all conclusions were based on analyses for the indirect/direct measures of bias. Yes/no judgments for the correspondence between self-reported bias and measures of actual bias were made based on the significance of the indirect bias x research consistency interaction (and direct bias and research consistency, in Studies 5 and 6) in the regression analyses predicting each measure of bias.
### Table 22

**Awareness of Bias: Effect sizes across studies**

<table>
<thead>
<tr>
<th></th>
<th>Study 2</th>
<th>Study 3 (Religiosity)</th>
<th>Study 3 (Political)</th>
<th>Study 4</th>
<th>Study 5</th>
<th>Study 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Believe less biased than expected</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Indirect: $d=0.39$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct: $d=0.16$</td>
</tr>
<tr>
<td><strong>Greater admission on indirect vs. direct measure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$d=0.38$</td>
<td>$d=0.16$</td>
</tr>
<tr>
<td><strong>Greater admission for belief-inconsistent vs. consistent evidence</strong></td>
<td>Indirect: $d=0.09$</td>
<td>Indirect: $d=0.27$</td>
<td>Indirect: $d=0.34$</td>
<td>Indirect: $d=0.32$</td>
<td>Indirect: $d=0.20$</td>
<td>Indirect: $d=0.13$</td>
</tr>
<tr>
<td></td>
<td>Indirect: $d=0.30$</td>
<td>Direct: $d=0.04$</td>
<td>Direct: $d=0.04$</td>
<td>Direct: $d=0.04$</td>
<td>Direct: $d=0.04$</td>
<td>Direct: $d=0.04$</td>
</tr>
<tr>
<td></td>
<td>Indirect: $d=0.58$</td>
<td>Direct: $d=0.29$</td>
<td>Direct: $d=0.29$</td>
<td>Direct: $d=0.29$</td>
<td>Direct: $d=0.29$</td>
<td>Direct: $d=0.29$</td>
</tr>
<tr>
<td><strong>Correspondence of self-reported bias with subjective measure of bias</strong></td>
<td>Indirect Consistent: $r=0.41$</td>
<td>Indirect Consistent: $r=0.40$</td>
<td>Indirect Consistent: $r=0.26$</td>
<td>Indirect Consistent: $r=0.31$</td>
<td>Indirect Consistent: $r=0.22$</td>
<td>Indirect Consistent: $r=0.28$</td>
</tr>
<tr>
<td></td>
<td>Inconsistent: $r=-0.26$</td>
<td>Inconsistent: $r=-0.17$</td>
<td>Inconsistent: $r=-0.07$</td>
<td>Inconsistent: $r=-0.15$</td>
<td>Inconsistent: $r=-0.07$</td>
<td>Inconsistent: $r=-0.19$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct Consistent: $r=0.01$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$r=0.11$</td>
<td>$r=-0.31$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct Consistent: $r=0.01$</td>
</tr>
</tbody>
</table>
Table 23

**Does exposure to belief-inconsistent evidence, compared to belief-consistent evidence, reduce support for science?**

(a) **Effects of belief-inconsistent (vs. consistent) evidence on support for science: General conclusions**

<table>
<thead>
<tr>
<th></th>
<th>Study 2</th>
<th>Study 3 (Religiosity)</th>
<th>Study 3 (Political)</th>
<th>Study 4</th>
<th>Study 5</th>
<th>Study 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific impotence effect</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Reduced general support for science</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Reduced behavioral support for science</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Yes/no judgments were made based on the significance of the *t*-test in each study that compared responses between those who received belief-consistent and inconsistent evidence. The Study 3 analysis for general support for science was conducted by excluding those who received mixed evidence.

(b) **Effects of belief-inconsistent (vs. consistent) evidence on support for science: Effect sizes across studies**

<table>
<thead>
<tr>
<th></th>
<th>Study 2</th>
<th>Study 3 (Religiosity)</th>
<th>Study 3 (Political)</th>
<th>Study 4</th>
<th>Study 5</th>
<th>Study 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific impotence effect</td>
<td>$d=0.28$</td>
<td>$d=0.46$</td>
<td>$d=0.16$</td>
<td>$d=0.33$</td>
<td>$d=0.51$</td>
<td>$d=0.52$</td>
</tr>
<tr>
<td>Reduced general support for science</td>
<td>$d=0.12$</td>
<td>$d=0.35$</td>
<td>$d=0.09$</td>
<td>$d=0.25$</td>
<td>$d=0.33$</td>
<td></td>
</tr>
<tr>
<td>Reduced behavioral support for science</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total donation to NSF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Donation to NSF/Total amount donated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advocate for science funding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signed letter to advocate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note. Effect sizes were calculated from the results of the $t$-tests or chi-square tests comparing responses between those who received belief-consistent and inconsistent evidence. The effect size for Study 3 was calculated by comparing those presented with two belief-consistent studies to those presented with two belief-inconsistent studies (i.e., excluding those presented with mixed evidence).
Figure 1. Model of ideologically motivated reasoning processes that lead to belief preservation. Adapted from Munro & Ditto (1997) and Klaczynski (2000).
Figure 2. General perceptions of how strongly participants believe they and others ignore, discredit, and challenge evidence, get defensive, and remain objective when presented with information challenging their views. Responses ranged from 1 to 7, with higher numbers representing more strongly ignoring, discrediting, and challenging evidence and greater defensiveness and objectivity. Error bars represent one standard error above and below the mean.
Figure 3. Subjective bias (i.e., evaluations of the quality of the research) as a function of research findings (i.e., religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious participants). Scores ranged from 1 to 8, with higher scores representing more favorable evaluations of the research. Error bars represent one standard error above and below the mean.
Figure 4. Subjective bias (i.e., evaluations of the quality of the research) as a function of the consistency of the research with participants’ beliefs (i.e., belief-inconsistent vs. belief-consistent). Scores ranged from 1 to 8, with higher scores representing more favorable evaluations of the research. Error bars represent one standard error above and below the mean.
Figure 5. Self-reported bias (indirect bias, direct bias, objectivity, and defensiveness) in response to belief-inconsistent and belief-consistent evidence. Indirect bias assessed beliefs about the extent to which “evaluations of the research were influenced by pre-existing views”; direct bias assessed beliefs about how “biased” participants were in evaluating the research. Objectivity measured how objective participants believed they were when reading about the research, and defensiveness assessed how defensive participants felt when reading about the research. All items were rated on 7-point scales, with higher numbers representing greater perceived bias, objectivity, or defensiveness. Missing bars for a study indicate that the particular measure of bias was not included in that study.
Figure 6. The scientific impotence effect. Ratings of agreement with the statement that, “the question addressed by the research cannot not be answered using scientific methods” as a function of research findings (religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious participants). Scores ranged from 1 (strongly disagree) to 8 (strongly agree). Error bars represent one standard error above and below the mean.
Figure 7. The scientific impotence effect. Ratings of agreement with the statement that, “the question addressed by the research cannot not be answered using scientific methods” as a function of the consistency of the research findings with participants’ beliefs (belief-consistent vs. belief-inconsistent). Scores ranged from 1 (strongly disagree) to 8 (strongly agree). Error bars represent one standard error above and below the mean.
Figure 8. General support for science as a function of research findings (religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious participants). Scores ranged from 1 to 7, with higher numbers indicating greater overall support for science. Error bars represent one standard error above and below the mean.
Figure 9. General support for science as a function of the consistency of the research findings with participants’ beliefs (belief-consistent vs. belief-inconsistent). Scores ranged from 1 to 7, with higher numbers indicating greater overall support for science. Error bars represent one standard error above and below the mean.
Figure 10. Subjective bias (i.e., evaluations of the quality of the research) for the political research in Study 3 as a function of research findings (i.e., conservative-enhancing vs. liberal-enhancing) and political orientation (conservative vs. liberal participants). Scores ranged from 1 to 8, with higher numbers representing more favorable evaluations of the research. Error bars represent one standard error above and below the mean.
Figure 11. In Study 3, assessment of the bias (indirect bias, defensiveness, objectivity) that each target did (self, researchers) or would (other, in-group, out-group) exhibit when reading about (or conducting) the religiosity and political research. Indirect bias assessed beliefs about the extent to which each target’s evaluations (or conclusions, for the researchers) were or would be influenced by their pre-existing views. Objectivity measured how objective each target was or would be, and defensiveness assessed how defensive each target felt or would feel when reading about the research. Participants did not receive the defensiveness item for the researchers. All items were rated on 7-point scales, with higher numbers representing greater perceived bias, objectivity, or defensiveness. Error bars represent one standard error above and below the mean.
Figure 12. The scientific impotence effect. Ratings of agreement with the statement that, “the question addressed by the research cannot be answered using scientific methods” for the political research in Study 3 as a function of research findings (conservative-enhancing vs. liberal-enhancing) and political orientation (conservative vs. liberal participants). Scores ranged from 1 (strongly disagree) to 8 (strongly agree). Error bars represent one standard error above and below the mean.
Figure 13. General support for science in Study 3 as a function of whether participants received two belief-inconsistent studies, two belief-consistent studies, or one inconsistent and one consistent study (mixed). Scores ranged from 1 to 7, with higher numbers indicating greater overall support for science. Error bars represent one standard error above and below the mean.
Figure 14. Procedure for Studies 4 and 5.
Figure 15. Absolute bias as a function of research findings (i.e., religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious participants). Absolute bias in recall indicates deviation from the correct number (Study 4) or percentage (Studies 5-6) of studies that favored the group indicated by the research (0=no bias, positive numbers=overestimating the number of studies favoring the group indicated by the research, and negative numbers=underestimating the number of studies favoring the group indicated by the research). Absolute bias in misrecall indicates the number (Study 4) or percentage (Studies 5-6) of studies misrecalled as favoring the opposite group than was shown by the research (0=correctly recalling that no studies favored this group, and positive numbers=misrecalling studies favoring this group). Error bars represent one standard error above and below the mean.
Figure 16. Absolute bias as a function of the consistency of the research with participants’ beliefs (i.e., belief-inconsistent vs. belief-consistent). Absolute bias in recall indicates deviation from the correct number (Study 4) or percentage (Studies 5-6) of studies that favored the group indicated by the research (0=no bias, positive numbers=overestimating the number of studies favoring the group indicated by the research, and negative numbers=underestimating the number of studies favoring the group indicated by the research). Absolute bias in misrecall indicates the number (Study 4) or percentage (Studies 5-6) of studies misrecalled as favoring the opposite group than was shown by the research (0=correctly recalling that no studies favored this group, and positive numbers=misrecalling studies favoring this group). Error bars represent one standard error above and below the mean.
Figure 17. Belief about the relationship between religiosity and life outcomes as a function of research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious) and time of assessment (T1, pre-manipulation vs. T2, post-manipulation vs. belief at T1 recalled at T2). Scores ranged from 1 (strongly related to negative outcomes) to 9 (strongly related to positive outcomes). In Study 4, participants only reported their belief at T2. Error bars represent one standard error above and below the mean.
Figure 18. Self-assessment of bias (indirect and direct bias) as a function of order (assessed bias first vs. evaluated research first). Indirect bias assessed beliefs about the extent to which “evaluations of the research were influenced by pre-existing views”; direct bias assessed beliefs about how “biased” participants were in evaluating the research. Items were rated on 7-point scales, with higher numbers representing greater perceived bias. The direct bias measure was not included in Study 4. Error bars represent one standard error above and below the mean.
Figure 19. Donations to the National Science Foundation (out of $1) as a function of research findings (religion-enhancing vs. religion-disparaging) and religious orientation (religious vs. non-religious participants). The total amount donated is the dollar amount allocated to the NSF. The donation to the NSF / Total amount donated is the dollar amount allocated to the NSF divided by the total amount donated to the NSF and the Save the Tiger Fund. Error bars represent one standard error above and below the mean.
Figure 20. Donations to the National Science Foundation (out of $1) as a function of the consistency of the research with participants’ beliefs (i.e., belief-inconsistent vs. belief-consistent). The total amount donated is the dollar amount allocated to the NSF. The donation to the NSF / Total amount donated is the dollar amount allocated to the NSF divided by the total amount donated to the NSF and the Save the Tiger Fund. Error bars represent one standard error above and below the mean.
Figure 21. Study 6 procedure.
Expected (at T1, before the manipulation) and perceived (at T2, after the manipulation) bias (indirect bias, direct bias, defensiveness, effort critiquing, and skepticism) in Study 6. For expected defensiveness, effort critiquing, and skepticism, responses to the inconsistent questions were used for participants who were subsequently presented with belief-inconsistent evidence and responses to the consistent items were used for participants subsequently presented with belief-consistent evidence. Indirect bias assessed beliefs about the extent to which evaluations of the research would be or were influenced by pre-existing views; direct bias assessed beliefs about how biased participants would be or were in evaluating the research. Defensiveness assessed perceived and expected defensiveness when reading about the research, effort critiquing measured the effort participants expected and perceived exerting critiquing the research, and skepticism assessed expected and perceived skepticism in response to the research. All items were rated on 7-point scales, with higher numbers representing greater perceived bias, defensiveness, effort critiquing the research, and skepticism. Error bars represent one standard error above and below the mean.
Figure 23. Study 6 expected (at T1, before the manipulation) and perceived (at T2, after the manipulation) bias (indirect bias, direct bias, defensiveness, effort critiquing, and skepticism) in response to belief-consistent and inconsistent evidence. Indirect bias assessed beliefs about the extent to which evaluations of the research would be or were influenced by pre-existing views; direct bias assessed beliefs about how biased participants would be or were in evaluating the research. Defensiveness assessed perceived and expected defensiveness when reading about the research, effort critiquing measured the effort participants expected and perceived exerting critiquing the research, and skepticism assessed how skeptical participants expected and perceived being of the research. All items were rated on 7-point scales, with higher numbers representing greater perceived bias, defensiveness, effort critiquing the research, and skepticism. Error bars represent one standard error above and below the mean.
Figure 24. Study 6 expected (at T1, before the manipulation) and perceived (at T2, after the manipulation) bias (indirect bias, direct bias, defensiveness, effort critiquing, and skepticism) as a function of post-manipulation order (assessed bias first vs. evaluated research first). For expected defensiveness, effort critiquing, and skepticism, responses to the inconsistent questions were used for participants who were subsequently presented with belief-inconsistent evidence and responses to the consistent items were used for participants subsequently presented with belief-consistent evidence. Indirect bias assessed beliefs about the extent to which evaluations of the research would be or were influenced by pre-existing views; direct bias assessed beliefs about how biased participants would be or were in evaluating the research. Defensiveness assessed perceived and expected defensiveness when reading about the research, effort critiquing measured the effort participants expected and perceived exerting critiquing the research, and skepticism assessed expected and perceived skepticism in response to the research. All items were rated on 7-point scales, with higher numbers representing greater perceived bias, defensiveness, effort critiquing the research, and skepticism. Error bars represent one standard error above and below the mean.
Appendix A

Study 4 Research Summaries

Summary 1

In one study, the Life Span Project researchers examined the relationship between religiosity and psychological well-being. The researchers surveyed a random sample of 8,000 participants. All participants were 18 years of age or older. They found that [religious/non-religious] participants were significantly less likely to suffer from anxiety and depression than were [non-religious/religious] participants. [Religious/non-religious] participants also reported greater life satisfaction than did the [non-religious/religious] participants surveyed. These results suggest that [religious/non-religious] individuals have more positive psychological outcomes than do [non-religious/religious] individuals.

Summary 2

In another study, the Life Span Project explored the relationship between religiosity and interpersonal outcomes. In a large community sample of 30-70 year old adults, [religious/non-religious] participants reported having significantly more close friends and greater social support than did [non-religious/religious] participants. In addition, [religious/non-religious] participants were less likely to be divorced than were [non-religious/religious] participants. From these findings, the researchers concluded that [religious/non-religious] individuals are more likely to have satisfying interpersonal relationships than are [non-religious/religious] individuals.

Summary 3

The Life Span Project examined archival data from the General Social Survey, a large, nationwide survey, to investigate whether religious or non-religious individuals have higher incomes and hold higher positions in their area of employment. The researchers found no difference in income between religious and non-religious individuals. In each area of employment (e.g., business; education; law; healthcare; community; art, media, and entertainment; military), there was also no difference between religious and non-religious individuals' position level within their occupation. The researchers thus concluded that religiosity is unrelated to income and job status.

Summary 4

The researchers investigated personality differences between religious and non-religious individuals by administering the Big Five Personality Inventory, a highly validated personality test, to a large, nationally representative sample of adults. The results showed that [religious/non-religious] participants scored higher in conscientiousness and openness to experience, and lower in neuroticism, than did [non-religious/religious] participants. These findings suggest that [religious/non-religious] individuals are more conscientious and open to new experiences, and less neurotic, than are [non-religious/religious] individuals.

Summary 5

Cognitive complexity refers to the pattern of thinking an individual adopts when considering an issue or problem. People high in cognitive complexity think about many different aspects of an
issue and consider the various, complex ways in which these different aspects interact. Cognitive complexity is a critical skill involved in problem solving. The Life Span Project researchers administered a cognitive complexity test to a sample of 12,000 students at various colleges and universities throughout the United States. Overall, [religious/non-religious] participants scored in the 65th percentile on this test, whereas [non-religious/religious] participants scored in the 43rd percentile. These findings suggest that [religious/non-religious] individuals tend to be higher in cognitive complexity than [non-religious/religious] individuals.
Appendix B

Study 4 Behavioral Support for Science Measure: Letter to Representative

Last Spring, the House of Representatives passed a bill that drastically cut funding for scientific research at the National Science Foundation. In particular, the bill singled out the Social, Behavioral, and Economic Sciences Directorate at the National Science Foundation for unwarranted and massive cuts, authorizing funding levels that date back to the late 1990s.

Please check one of the following:

_____ I would like to advocate for increased funding for scientific research at the National Science Foundation. I have signed and dated the letter below and would like to have it sent to the House of Representatives.

_____ I do not wish to advocate for increased funding for scientific research at the National Science Foundation at this time and therefore have left the spaces below blank.

Dear Representative:

I am writing to advocate for increased federal investments in scientific research. The National Science Foundation is a key source of funding for scientific research in our nation. Federal funding for scientific research plays a critical role in the advancement of scientific knowledge, and as such, affects the well-being of our citizens and the competitiveness of our country. The knowledge gained from basic research influences decisions and practices in every sector of society, including law and policy, education, and medicine.

Science includes the study of social and behavioral phenomena. As a result of Social, Behavioral, and Economic Science funded research at the National Science Foundation, we are learning: how to respond to disasters; improve education for our children; enhance the safety of our troops; prevent violence among our youth; improve public health; auction the airways efficiently; create models for water planning to enhance sustainability; and help paralyzed people communicate. These investments are worth of taxpayer support.

I urge you to adopt policies that create steady, sustained, and real growth targets for basic science research at the National Science Foundation that exceed inflation. I also ask you to oppose any efforts to target funding cuts at areas of social and behavioral sciences that provide the knowledge critical for addressing many of the nation's challenges.

Thank you for your time and consideration.
Name: ______________________
Date: ______________________
Appendix C

Study 4 Behavioral Support for Science Donation Measure

To thank participants for helping with our research, we have decided to donate $1.00 on each participant's behalf. We have selected two organizations for these donations:

**Save the Tiger Fund**

The Save the Tiger Fund is an international organization aimed at directing and implementing the most effective global conservation strategies to save wild tigers. The organization seeks to ensure the future of the world's most endangered cats: tigers, lions, jaguars, and snow leopards.

**National Science Foundation**

The National Science Foundation is a federal agency that funds research and education in all fields of science and engineering. The National Science Foundation is a major source of funding for scientific research, and as such, plays an important role in the advancement of scientific knowledge.

You may donate up to $1.00, divided in whatever way you please, to the organizations listed below. Please indicate how much you would like to donate to each organization. (Note: The total sum of your donations to each organization must not exceed $1.00).

Save the Tiger Fund $_____
National Science Foundation $_____


Appendix D

Studies 5 and 6 Research Summaries

Summary 1 (2 studies)

The Life Span Project researchers conducted two studies examining the relationship between religiosity and psychological well-being among adults. The first study assessed psychological well-being by measuring anxiety and depression; the second assessed psychological well-being by measuring happiness and life satisfaction.

In Study 1, the researchers found that [religious/non-religious] participants were significantly less likely to suffer from anxiety and depression than were [non-religious/religious] participants. In Study 2, [religious/non-religious] participants reported greater happiness and life satisfaction than did the [non-religious/religious] participants surveyed. These results suggest that [religious/non-religious] individuals have more positive psychological outcomes than do [non-religious/religious] individuals.

Summary 2 (3 studies)

The Life Span Project also conducted three studies investigating the relationship between religiosity and interpersonal outcomes in large community samples of 30-70 year old adults. In the first study, they assessed interpersonal well-being by having participants report subjective levels of social support. In a second study, they assessed interpersonal well-being by asking participants to record the first names of their closest friends. In a third study, they assessed divorce rates among participants who had married in their lifetime.

In Study 1, [religious/non-religious] participants reported greater subjective levels of social support than did [non-religious/religious] participants. In Study 2, [religious/non-religious] participants listed significantly more close friends than did [non-religious/religious] participants. Study 3 found that [religious/non-religious] participants were less likely to be divorced than were [non-religious/religious] participants. From these findings, the researchers concluded that [religious/non-religious] individuals are more likely to have satisfying interpersonal relationships than are [non-religious/religious] individuals.

Summary 3 (2 studies)

The Life Span Project conducted two studies investigating whether religiosity is related to vocational outcomes. In the first study, they examined income levels from archival records of the American Community Survey, a large, nationwide survey conducted by the U.S. Census Bureau. In the second study, they examined archival data from the General Social Survey, another large, nationwide survey, to investigate whether religious or non-religious individuals hold higher positions in their area of employment (e.g., business; education; law; healthcare; community; art, media, and entertainment; military).

In Study 1, the researchers found no difference in income between religious and non-religious individuals. In Study 2, there was also no difference between religious and non-religious
individuals' position level within their occupation. The researchers thus concluded that religiosity is unrelated to income and job status.

**Summary 4 (1 study)**

The researchers conducted a study investigating personality differences between religious and non-religious individuals by administering the Big Five Personality Inventory, a highly validated personality test, to a large, nationally representative sample of adults.

The results showed that [religious/non-religious] participants scored higher in conscientiousness and openness to experience, and lower in neuroticism, than did [non-religious/religious] participants. These findings suggest that [religious/non-religious] individuals are more conscientious and open to new experiences, and less neurotic, than are [non-religious/religious] individuals.

**Summary 5 (2 studies)**

Cognitive complexity refers to the pattern of thinking an individual adopts when considering an issue or problem. People high in cognitive complexity think about many different aspects of an issue and consider the various, complex ways in which these aspects interact. Cognitive complexity is a critical skill involved in problem solving. The Life Span Project researchers conducted two nationwide studies examining the relationship between religiosity and performance on a cognitive complexity test, one among a college student sample and the other among a sample of adults.

In the study of college students, [religious/non-religious] participants scored in the 65th percentile on this test, whereas [non-religious/religious] participants scored in the 43rd percentile. In the study of adults, [religious/non-religious] participants scored in the 58th percentile, whereas [non-religious/religious] participants scored in the 46th percentile. These findings suggest that [religious/non-religious] individuals tend to be higher in cognitive complexity than [non-religious/religious] individuals.
Belief Importance

In order to gain a sense of the particular beliefs people value most, participants were first asked to list ten beliefs they hold strongly about “how life should be lived or how society should be governed,” such as “social or political beliefs, religious beliefs, or beliefs about lifestyle choices.”

When asked to identify beliefs they hold strongly, the majority of participants identified beliefs pertaining to values or lifestyle choices (\(M = 81.1\%\) across all 10 beliefs). Political (\(M = 12.7\%\) across the 10 beliefs) and religious (\(M = 6.1\%\) across the 10 beliefs) beliefs were less commonly identified.

Although participants were most likely to identify values or lifestyle choices as beliefs they hold strongly, rather than political or religious beliefs, this finding may be attributed to how the question was phrased. That is, participants may have primarily reported values or lifestyle choices because, when defining the beliefs of interest, “how life should be lived” was stated before “how society should be governed.”

After listing their beliefs, participants were asked to rate, overall, how important these beliefs are to them (on an 8-point scale ranging from 1=not at all important to 8=extremely important), and to describe, in a free response format, why these beliefs are important to them.

Overall, participants rated their beliefs as very important to them (\(M = 6.90, SD = 1.00\)). The most common responses participants provided for why their beliefs are important to them is that their beliefs help guide their behavior (29.5%), self-
improvement (6.8%), and happiness (15.9%), define who they are (8.0%) and their upbringing (6.8%), and guide society’s improvement (15.9%). A subset of participants provided a response that did not fit into any of these categories (17.1%).

**Study 3**

**Relationship between religious and political study evaluations**

Across conditions, participants’ evaluations of the religiosity study were positively correlated with their evaluations of the political study, $r(291) = .36, p < .001$. To test for differences in the strength of this relationship based on whether participants received research findings both consistent, both inconsistent, or of mixed consistency with their views, a regression analysis was performed. Religious study evaluations and the consistency variable were entered as predictors in Step 1, and a religious study evaluations x consistency interaction term was entered in Step 2.

Religious study evaluations were associated with political study evaluations, $\beta = .36, B = .36, SE = .05, t = 6.60, p < .001$. Consistency was not associated with political study evaluations, $\beta = .06, B = .12, SE = .11, t = 1.08, ns.$, but the interaction between religious study evaluations and consistency was significant, $\beta = -.46, B = -.14, SE = .06, t = -2.27, p = .02$. Simple slopes analyses revealed that participants’ religiosity study evaluations were more strongly associated with their political study evaluations when both studies were consistent, $\beta = .50, B = .44, SE = .09, t = 4.68, p < .001$, or inconsistent, $\beta = .43, B = .36, SE = .09, t = 4.20, p < .001$, with their views than when one study was consistent and the other inconsistent, $\beta = .16, B = .16, SE = .08, t = 1.95, p = .05$.

**Correspondence of defensiveness and objectivity with subjective bias**
To the extent that participants were aware of their bias when evaluating consistent evidence, self-reported objectivity should be negatively associated with subjective bias (i.e., greater self-reported objectivity should be associated with evaluating belief-consistent evidence more harshly), and to the extent that participants were aware of their bias when evaluating inconsistent evidence, self-reported objectivity should be positively associated with subjective bias (i.e., greater self-reported objectivity should be associated with evaluating belief-inconsistent evidence more favorably). If participants exhibited awareness of bias, it is unclear whether self-reported defensiveness would be associated with subjective bias for consistent evidence, but defensiveness should be negatively associated with subjective bias for inconsistent evidence (i.e., greater self-reported defensiveness should be associated with evaluating belief-inconsistent evidence more harshly).

**Religiosity study.** Defensiveness was negatively associated with subjective bias, $\beta = -0.23$, $B = -0.24$, $SE = .06$, $t = -3.78$, $p < .001$; participants who reported greater defensiveness evaluated the religiosity study less favorably. Defensiveness did not interact with study consistency to predict subjective bias, $\beta = .25$, $B = 0.22$, $SE = 0.14$, $t = 1.57$, $p = .12$. However, among those presented with belief-inconsistent evidence, defensiveness was negatively associated with subjective bias, $\beta = -0.32$, $B = -0.29$, $SE = 0.07$, $t = -3.96$, $p < .001$, such that participants reported greater defensiveness when evaluating belief-inconsistent evidence more harshly.

Self-reported objectivity was not significantly associated with subjective bias, $\beta = .09$, $B = 0.11$, $SE = .07$, $t = 1.61$, $p = 0.11$, nor was there an objectivity x study consistency interaction, $\beta = -0.43$, $B = -0.21$, $SE = 0.14$, $t = -1.53$, $p = 0.13$. 
Political study. Defensiveness was also negatively associated with subjective bias for the political study, $\beta = -0.15, B = -0.14, SE = 0.06, t = -2.59, p = .01$, such that participants who reported greater defensiveness evaluated the political study less favorably. There was also a significant defensiveness x study consistency interaction, $\beta = 0.33, B = 0.27, SE = 0.13, t = 2.10, p < .04$. As predicted, defensiveness was unrelated to subjective bias for those presented with belief-consistent evidence, $\beta = 0.05, B = 0.06, SE = 0.11, t = 0.54, p = .59$, but negatively associated with subjective bias for those presented with belief-inconsistent evidence, $\beta = -0.24, B = -0.21, SE = 0.07, t = -3.20, p = .002$. Participants who reported greater defensiveness evaluated belief-inconsistent evidence more harshly.

Self-reported objectivity was not significantly associated with subjective bias, $\beta = 0.09, B = 0.11, SE = 0.07, t = 1.68, p = .10$, nor was there an objectivity x study consistency interaction, $\beta = -0.28, B = -0.14, SE = 0.14, t = -0.99, p = .32$.

Individual differences in the bias blind spot

Religiosity and political bias blind spot measures were created by computing difference scores for the three bias blind spot questions for each study. That is, participants’ responses to each question assessing how strongly they believed their own reasoning was biased was subtracted from the parallel question assessing how strongly they believed others’ reasoning was biased (the objectivity item was reverse-coded). These three difference scores were then averaged. The reliability of the two measures was relatively low ($\alpha_{\text{religiosity study}} = .54; \alpha_{\text{political study}} = .55$).

In-group-out-group religiosity and political bias blind spot measures were also created by computing difference scores for the three in-group-out-group bias blind spot
questions for each study. These three difference scores were then averaged. Higher scores represented a greater in-group-out-group bias blind spot. The reliability of these measures was low ($\alpha_{\text{religiosity study}} = .52; \alpha_{\text{political study}} = .35$).

The religiosity and political bias blind spot measures were positively correlated with each other, $r(290) = .42, p < .001$, and the religiosity in-group-out-group bias blind spot measure was positively correlated with the political in-group-out-group bias blind spot measure, $r(290) = .27, p < .001$. Those who demonstrated a greater bias blind spot with respect to religious evaluations also demonstrated a greater bias blind spot with respect to political evaluations (self-other and in-group-out-group).

The religiosity self-other bias blind spot measure was also positively correlated with the religiosity in-group-out-group bias blind spot measure, $r = .47, p < .001$, and the political self-other bias blind spot measure was positively correlated with the political in-group-out-group bias blind spot measure, $r = .35, p < .001$, suggesting that people who believe others are more biased than they are themselves also tend to believe out-group members are more biased than in-group members.

Together, these results suggest that individual differences exist in people’s tendency to believe others (and people that differ from them) are more biased than they are themselves (and people similar to them).

**Study 4**

**Relationships among subjective bias, absolute bias, and beliefs**

To assess the relationships among subjective bias, absolute bias, and belief about the relationship between religiosity and life outcomes, a series of regression analyses was performed. Research consistency was included in each analysis as a moderator.
Participants’ responses to the question asking how they believe religiosity is related to life outcomes were first recoded so that higher scores indicated holding a stronger belief in the direction of what the research showed (i.e., higher scores indicated believing that religiosity is more strongly associated with positive life outcomes for those in the religion-enhancing condition but more strongly associated with negative life outcomes for those in the religion-disparaging condition).

**Subjective bias and absolute bias.** Neither research consistency, $\beta = -0.03$, $B = -0.04$, $SE = 0.08$, $t = -0.50$, $p = 0.62$, nor subjective bias (i.e., research evaluations), $\beta = -0.05$, $B = -0.02$, $SE = 0.02$, $t = -0.80$, $p = 0.42$, predicted overall absolute bias (i.e., deviation from the correct response). However, there was a research consistency x subjective bias interaction, $\beta = 0.61$, $B = 0.09$, $SE = 0.04$, $t = 2.17$, $p = .03$. Among those presented with belief-consistent evidence, subjective bias was unrelated to overall absolute bias, $\beta = 0.06$, $B = 0.03$, $SE = 0.03$, $t = 0.87$, $p = .38$. However, among those presented with belief-inconsistent evidence, evaluating the research more favorably was associated with recalling fewer studies favoring the outgroup, $\beta = -0.18$, $B = -0.06$, $SE = 0.03$, $t = -2.38$, $p = .02$. (Similarly, among those presented with belief-inconsistent evidence, evaluating the research more favorably was associated with misrecalling evidence favoring the ingroup, $\beta = 0.21$, $B = 0.08$, $SE = 0.03$, $t = 2.85$, $p = .005$).

**Subjective bias and beliefs.** Subjective bias (i.e., research evaluations) predicted how strongly participants believed in what the research found, $\beta = .43$, $B = 0.52$, $SE = 0.07$, $t = 7.22$, $p < .001$. Participants who evaluated the research more favorably reported believing more strongly in what the research showed. Research consistency (belief-consistent vs. belief-inconsistent) also predicted how strongly participants believed in
what the research found, $\beta = .36$, $B = 1.70$, $SE = .28$, $t = 5.97$, $p < .001$. Those presented with belief-consistent evidence reported believing more strongly in what the research showed than did those presented with belief-inconsistent evidence. The interaction between research consistency and subjective bias was nonsignificant, $\beta = 0.03$, $B = 0.02$, $SE = 0.15$, $t = 0.10$, $p = 0.92$.

**Absolute bias and beliefs.** Neither absolute bias measure nor their interaction with research consistency predicted how strongly participants believed in what the research found, $|t|$’s < 1.19, $p$’s > 0.23.

**Correspondence between defensiveness and objectivity and subjective bias**

Defensiveness was negatively associated with subjective bias, $\beta = -0.20$, $B = -0.22$, $SE = .05$, $t = -4.08$, $p < .001$; participants who reported greater defensiveness evaluated the research less favorably. Defensiveness also interacted with research consistency to predict subjective bias, $\beta = .30$, $B = 0.28$, $SE = 0.13$, $t = 2.17$, $p = .03$. Among those presented with belief-inconsistent evidence, defensiveness was negatively associated with subjective bias, $\beta = -0.33$, $B = -0.28$, $SE = 0.06$, $t = -4.71$, $p < .001$, such that participants reported greater defensiveness when evaluating belief-inconsistent evidence more harshly. Defensiveness was unrelated to subjective bias among those presented with belief-consistent evidence, $\beta = 0.00$, $B = -0.01$, $SE = 0.11$, $t = -0.05$, $p = 0.96$.

Self-reported objectivity was marginally positively associated with subjective bias, $\beta = .11$, $B = 0.06$, $SE = .08$, $t = 1.80$, $p = 0.07$. The objectivity x research consistency interaction was nonsignificant, $\beta = -0.20$, $B = -0.11$, $SE = 0.13$, $t = -0.85$, $p = 0.40$. 
Correspondence between defensiveness and objectivity and absolute bias

Neither defensiveness nor the interaction between research consistency and defensiveness predicted scores on either measure of absolute bias, $t’s < 1.57, p’s > 0.11$. Likewise, neither objectivity nor the interaction between objectivity and research consistency predicted overall absolute bias (i.e., deviation from the correct response), $t’s < 1.54, p’s > 0.12$. However, self-reported objectivity marginally predicted the alternative measure of absolute bias (i.e., misrecalling the research showing evidence favoring the opposite group), $\beta = -0.10, B = -0.05, SE = 0.03, t = -1.95, p = .052$, such that participants who reported exerting more effort to remain objective misrecalled fewer studies favoring the opposite group.

Correspondence between defensiveness and objectivity and belief

Self-reported defensiveness predicted the strength of participants’ belief in what the research found, $\beta = -0.25, B = -0.37, SE = 0.11, t = -3.51, p = .001$, such that greater defensiveness was associated with reporting a weaker belief in what the research showed. The interaction between research consistency and defensiveness was nonsignificant, $\beta = -0.07, B = -0.11, SE = .34, t = -0.31, p = 0.76$. Neither objectivity, $\beta = -0.02, B = -0.03, SE = 0.12, t = -0.27, p = .79$, nor the interaction between objectivity and research consistency, $\beta = 0.46, B = 0.30, SE = 0.23, t = 1.28, p = 0.20$, predicted participants’ beliefs about the relationship between religiosity and life outcomes.

Study 5

Absolute bias analyses conducted separately for calculated and generated percentage measures
Recall. Participants were fairly accurate at recalling what the research found (calculated percentage deviation: $M = 3.91, SD = 13.41$; generated percentage deviation: $M = 4.80, SD = 15.87$). Three-way between-subjects ANOVAs were conducted to examine whether research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious), and order (evaluated research first vs. assessed bias first) affected the calculated and generated percentage measures of absolute bias. For both measures, all main effects and interactions were nonsignificant, $F$’s ≤ 3.23, $p$’s > 0.07.

Across levels of religiosity, there was no difference in absolute bias on the calculated, $t(378) = 0.34, p = 0.73$, or generated, $t(383) = -1.35, p = 0.18$, measures between those presented with belief-consistent and inconsistent evidence.

Misrecall. On average, participants tended not to misrecall a large percentage of studies favoring the other group (calculated percentage deviation: $M = 3.73, SD = 13.35$; generated percentage deviation: $M = 5.87, SD = 14.64$).

When examining the effects of research findings, religious orientation, and order, on these alternative measures of absolute bias, there were significant main effects for research findings, $F(1, 377) = 4.61, p = .03, d = 0.22$, and religious orientation, $F(1, 377) = 4.83, p = .03, d = 0.22$, on the generated percentage that participants misrecalled favoring the other group. Participants in the religion-disparaging condition misrecalled a greater percentage of studies favoring religious individuals ($M = 7.22, SD = 18.42$) than those in the religion-enhancing condition misrecalled favoring non-religious individuals ($M = 4.27, SD = 8.61$). Religious participants misrecalled a greater percentage of studies favoring the opposite group to what the research found ($M = 7.41, SD = 17.65$) than did
non-religious participants \((M = 4.23, SD = 10.50)\). All other main effects and interactions were nonsignificant for both measures, \(F’s < 2.15, p’s > 0.14\).

Across levels of religiosity, there was no difference on the calculated, \(t(378) = -0.06, p = 0.95\), and generated, \(t(282) = 1.31, p = 0.19\), misrecall measures between those presented with belief-consistent and inconsistent evidence.

**Correspondence between self-assessment of bias and absolute bias on calculated and generated percentage measures**

Indirect bias predicted the generated percentage of studies participants misrecalled favoring the opposite group, \(\beta = 0.11, B = 0.81, SE = 0.38, t = 2.11, p = 0.036\), such that perceiving evaluations to be more influenced by pre-existing views was associated with misrecalling a greater percentage of studies favoring the opposite group. All other main effects and interactions were nonsignificant, \(t’s < 1.26, p’s > 0.20\).

Neither direct bias nor its interaction with research consistency predicted any of the measures of absolute bias, \(t’s < 1.32, p’s > .18\).

There was a marginally significant interaction between defensiveness and research consistency for the generated percentage of studies participants misrecalled favoring the opposite group, \(\beta = 0.27, B = 1.77, SE = 1.01, t = 1.75, p = 0.08\), and a significant interaction for the calculated percentage of studies participants misrecalled, \(\beta = 0.38, B = 1.93, SE = 0.78, t = 2.47, p = 0.01\). For both measures, defensiveness was unrelated to misrecalling evidence favoring the opposite group among those presented with belief-inconsistent research (generated: \(\beta = -0.02, B = -0.20, SE = 0.72, t = -0.28, p = 0.78\); calculated: \(\beta = -0.06, B = -0.43, SE = 0.49, t = -0.88, p = 0.38\), but greater defensiveness was associated with misrecalling more evidence favoring the opposite
group for those presented with belief-consistent evidence (generated: $\beta = 0.18$, $B = 1.57$, $SE = 0.63$, $t = 2.54$, $p = 0.01$; calculated: $\beta = 0.18$, $B = 1.50$, $SE = 0.59$, $t = 2.55$, $p = 0.01$). All other main effects and interactions were nonsignificant, $|t|$’s $< 1.67$, $p$’s $> 0.09$.

There were also significant interactions between objectivity and research consistency for the calculated percentage of studies participants recalled favoring the correct group, $\beta = 0.66$, $B = 2.40$, $SE = 1.13$, $t = 2.12$, $p = 0.03$, and misrecalled favoring the opposite group, $\beta = -0.86$, $B = -2.63$, $SE = 0.95$, $t = -2.77$, $p = .006$. Among those presented with belief-consistent evidence, objectivity was associated with recalling a greater percentage of studies favoring the correct group, $\beta = 0.17$, $B = 1.84$, $SE = 0.81$, $t = 2.28$, $p = 0.02$, and misrecalling a lower percentage of studies favoring the incorrect group, $\beta = -0.25$, $B = -2.22$, $SE = 0.64$, $t = -3.45$, $p = .001$. Objectivity was unrelated to recall for those presented with belief-inconsistent evidence, $|t|$’s $< 0.71$, $p$’s $> 0.48$.

**Relationships among subjective bias, absolute bias, and belief change**

To assess the relationships among subjective bias, absolute bias, and belief about the relationship between religiosity and life outcomes, a series of regression analyses was performed. Research consistency was included in each analysis as a moderator. For these analyses, the recoded belief change variable was used, in which higher scores indicated greater belief change in the direction of what the research showed (i.e., more strongly believing that religiosity is associated with positive life outcomes for those in the religion-enhancing condition and more strongly believing that religiosity is associated with negative life outcomes for those in the religion-disparaging condition).

**Subjective bias and absolute bias.** Subjective bias (i.e., research evaluations) predicted absolute bias in recall, $\beta = -0.13$, $B = -0.90$, $SE = 0.40$, $t = -2.27$, $p = 0.02$. 
Evaluating the research more favorably was associated with less deviation from the correct response. No other main effects or interactions were significant for either absolute bias measure, $t$’s $|≤| 1.66, p$’s $>.09$.

**Subjective bias and belief change.** Subjective bias (i.e., research evaluations) predicted belief change, $\beta = 0.31, B = 0.28, SE = 0.05, t = 5.75, p < .001$. Participants who evaluated the research more favorably reported a stronger belief in what the research showed at T2 than at T1. Research consistency (belief-consistent vs. belief-inconsistent) also predicted how strongly participants believed in what the research found, $\beta = -0.16, B = -0.53, SE = 0.18, t = -2.96, p < .001$. Those presented with belief-inconsistent evidence reported less belief change in the direction of what the research showed than did those presented with belief-consistent evidence. The interaction between research consistency and subjective bias was nonsignificant, $\beta = -0.43, B = -0.16, SE = 0.10, t = -1.63, p = 0.11$.

**Absolute bias and belief change.** Neither absolute bias measure predicted or interacted with research consistency to predict belief change, $|t|$’s $< 0.73, p$’s $>.46$.

**Correspondence of defensiveness and objectivity with subjective bias**

Defensiveness was negatively associated with subjective bias, $\beta = -0.29, B = -0.33, SE = .05, t = -6.35, p < .001$; participants who reported greater defensiveness evaluated the research less favorably. The interaction between defensiveness and research consistency was nonsignificant, $\beta = .17, B = 0.14, SE = 0.11, t = 1.29, p = .20$.

Self-reported objectivity was positively associated with subjective bias, $\beta = .11, B = 0.17, SE = 0.07, t = 2.47, p = 0.01$; greater effort reported to remain objective while evaluating the research was associated with evaluating the research more favorably.
There was no interaction between objectivity and research consistency, $\beta = -0.30$, $B = -0.15$, $SE = 0.14$, $t = -1.11$, $p = 0.27$.

**Correspondence of defensiveness and objectivity with absolute bias**

Neither defensiveness nor its interaction with research consistency predicted absolute bias in recalling what the research found, $t'\, s \leq 0.65$, $p'\, s > 0.51$. Defensiveness was also unrelated to absolute bias in misrecalling what the research showed, $\beta = 0.03$, $B = 0.20$, $SE = 0.36$, $t = 0.55$, $p = 0.58$. However, there was a significant interaction between defensiveness and research consistency in predicting absolute bias in the percentage of studies participants misrecalled favoring the opposite group, $\beta = 0.32$, $B = 1.60$, $SE = 0.79$, $t = 2.01$, $p = .045$. For those presented with belief-inconsistent evidence, defensiveness was unrelated to misrecalling studies favoring the opposite group, $\beta = -0.05$, $B = -0.34$, $SE = 0.54$, $t = -0.64$, $p = 0.52$, whereas for those presented with belief-consistent evidence, greater defensiveness was associated with misrecalling more evidence favoring the opposite group, $\beta = 0.17$, $B = 1.25$, $SE = 0.53$, $t = 2.36$, $p = 0.02$.

Neither objectivity nor its interaction with research consistency predicted either measure of absolute bias, $|t'|\,' s < 1.20$, $p'\, s > 0.23$.

**Correspondence of defensiveness and objectivity with belief change**

Self-reported defensiveness was unrelated to belief change, $\beta = -0.03$, $B = -0.03$, $SE = 0.05$, $t = -20.50$, $p = .62$. The interaction between research consistency and defensiveness was also nonsignificant, $\beta = -0.09$, $B = -0.07$, $SE = 0.11$, $t = -0.62$, $p = 0.54$.

Objectivity was positively associated with belief change, $\beta = 0.13$, $B = 0.18$, $SE = 0.07$, $t = 2.54$, $p = .01$, such that participants who reported exerting greater effort to
remain objective exhibited greater belief change in the direction of the evidence presented. The interaction between objectivity and research consistency was nonsignificant, $\beta = 0.11$, $B = 0.05$, $SE = 0.14$, $t = 0.35$, $p = 0.73$.

**Study 6**

**Absolute bias analyses conducted separately for calculated and generated percentage measures**

**Recall.** Participants were fairly accurate at recalling what the research found (calculated percentage deviation: $M = 3.21$, $SD = 13.82$; generated percentage deviation: $M = 4.89$, $SD = 14.12$).

Three-way between-subjects ANOVAs were conducted to examine whether research findings (religion-enhancing vs. religion-disparaging), religious orientation (religious vs. non-religious), and order (evaluated research first vs. assessed bias first) influenced participants’ responses on the calculated and generated absolute bias measures. For the calculated percentage measure, there was a marginally significant main effect for research findings, $F(1, 334) = 3.62$, $p = .058$, $d = 0.21$. Participants in the religion-disparaging condition over-reported a slightly greater percentage of studies favoring non-religious individuals ($M = 4.62$, $SD = 16.26$) than those in the religion-enhancing condition over-reported favoring religious individuals ($M = 1.92$, $SD = 11.05$). There was also a marginally significant research findings by order interaction, $F(1, 334) = 3.48$, $p = .06$, $d = 0.20$. Among those who assessed their bias before evaluating the research, participants in the religion-disparaging condition over-reported a slightly greater percentage of studies favoring non-religious individuals ($M = 6.63$, $SD = 16.02$) than those in the religion-enhancing condition over-reported favoring religious
individuals ($M = 1.40, SD = 11.89), t(171) = 2.46, p = .015. This difference was not
significant among those who evaluated the research before assessing their bias, $t(170) = 0.23, p = 0.82$. All other main effects and interactions were non-significant, $F$'s < 1.51, $p$'s > 0.22.

For the generated percentage measure, there was a main effect for religious
orientation, $F(1, 351) = 4.02, p < .05, d = 0.21$, and a marginally significant main effect for order, $F(1, 351) = 3.20, p = .07, d = 0.19$. Religious participants ($M = 6.13, SD = 13.28$) over-reported a slightly greater percentage of studies favoring the group indicated by the research than did non-religious participants ($M = 3.45, SD = 14.94$). Participants who evaluated the research before assessing their bias ($M = 3.79, SD = 14.70$) tended to over-report a lower percentage of studies favoring the group indicated by the research than did those who assessed their bias first ($M = 5.97, SD = 13.48$), perhaps because there was a shorter delay between presentation of the research and recall among this group. There were also interactions between research findings and order, $F(1, 351) = 8.80, p = .003, d = 0.31$, and religious orientation and order, $F(1, 351) = 4.59, p = .03, d = 0.22$. As with the calculated percentage measure, among those who assessed their bias before evaluating the research, participants in the religion-disparaging condition over-reported the percentage of studies favoring non-religious individuals ($M = 9.02, SD = 15.08$) more than those in the religion-enhancing condition over-reported favoring religious individuals ($M = 3.63, SD = 11.56), $t(176) = 2.70, p = .008$. Among those who assessed their bias first, religious participants ($M = 8.83, SD = 12.62$) over-reported the percentage of studies favoring the group indicated by the research to a greater extent than did non-religious participants ($M = 3.21, SD = 13.78$), $t(175) = -2.82, p = .005$. These
differences were not significant among those who evaluated the research before assessing their bias, $|t|’s \leq 1.30, p \geq .19$.

Across levels of religiosity, there was no difference in recall on either the calculated, $t(340) = -1.10, p = 0.27$, or generated, $t(357) = 0.29, p = 0.78$, percentage measures between those presented with belief-consistent and inconsistent evidence.

**Misrecall.** On average, participants tended not to misrecall a large percentage of studies favoring the other group (calculated percentage deviation: $M = 4.46, SD = 10.14$; generated percentage deviation: $M = 5.56, SD = 12.93$).

For the calculated percentage favoring the opposite group to what the research showed, there was a marginally significant three-way interaction among research findings, religious orientation, and order, $F(1, 334) = 3.52, p = .06, d = 0.20$. However, simple effects performed on order revealed only a main effect for research findings among those who assessed their bias before evaluating the research, $F(1, 168) = 7.80, p = .006$, with those in the religion-enhancing condition misrecalling a greater percentage of studies favoring non-religious individuals ($M = 5.40, SD = 10.06$) than those in the religion-disparaging condition misrecalled favoring religious individuals ($M = 1.81, SD = 5.97$).

For the generated percentage favoring the opposite group, there was an interaction between research findings and order, $F(1, 316) = 4.70, p = .03, d = 0.25$. Among those who assessed their bias before evaluating the research, participants in the religion-enhancing condition ($M = 6.24, SD = 10.46$) misrecalled a greater percentage of studies favoring the opposite group from what the research showed than did those in the religion-disparaging condition ($M = 2.55, SD = 10.16$), $t(176) = -2.38, p < .02$. This difference
was not significant for those who evaluated the research before assessing their bias, $t(181) = 1.18, p = .24$. All other main effects and interactions were non-significant for both measures.

Across levels of religiosity, there was no difference in misrecall on either the calculated, $t(340) = 0.23, p = 0.82$, or generated, $t(357) = -0.13, p = 0.89$, percentage measures between those presented with belief-consistent and inconsistent evidence.

**Correspondence between self-assessment of bias and absolute bias**

**Pre-assessment of bias (Expected bias).** Expectations for evaluations to be influenced by pre-existing views (indirect bias T1) did not predict the calculated percentage of studies participants misrecalled favoring the opposite group from what the research showed, $\beta = .09, B = 0.48, SE = 0.29, t = 1.65, p = .10$, but indirect bias at T1 did interact with research consistency, $\beta = -0.46, B = -1.30, SE = 0.58, t = -2.25, p = .025$. Greater expectations for evaluations to be influenced by pre-existing views were associated with misrecalling a greater percentage of studies favoring one's own group (i.e., the opposite group favored by the research) among those presented with belief-inconsistent evidence, $\beta = .22, B = 1.19, SE = 0.42, t = 2.81, p = .006$. Expectations for evaluations to be influenced by pre-existing views were unrelated to recall among those presented with belief-consistent evidence, $\beta = -0.02, B = -0.11, SE = 0.39, t = -0.28, p = .78$. All main effects and interactions for the other absolute bias measures were nonsignificant, $t$’s < 1.08, $p$’s > 0.28.

Expected bias (direct bias T1) did not predict or interact with research consistency to predict any of the absolute bias measures, $t$’s < 1.73, $p$’s > 0.08.
Expected defensiveness did not predict, $\beta = -0.05$, $B = -0.43$, $SE = 0.43$, $t = -0.99$, $p = .32$, or interact with research consistency, $\beta = -0.16$, $B = -0.71$, $SE = 0.87$, $t = -0.82$, $p = .42$, to predict the calculated percentage of studies participants recalled favoring the group indicated by the research. Expected defensiveness also did not predict the generated percentage of studies participants recalled favoring the group indicated by the research, $\beta = -0.04$, $B = -0.34$, $SE = 0.43$, $t = -0.78$, $p = .44$, but expected defensiveness did interact with research consistency, $\beta = -0.37$, $B = -1.75$, $SE = 0.86$, $t = -2.02$, $p = .04$.

Expected defensiveness was unrelated to recall among those presented with belief-inconsistent evidence, $\beta = 0.08$, $B = 0.65$, $SE = 0.61$, $t = 1.07$, $p = .29$. However, there was a marginal relationship between expected defensiveness and recall among those presented with belief-consistent evidence, $\beta = -0.13$, $B = -1.10$, $SE = 0.60$, $t = -1.83$, $p < .07$, such that participants who expected to feel more defensive in response to belief-consistent evidence over-recalled a greater percentage of studies favoring the group indicated by the research (i.e., their in-group).

Similarly, expected defensiveness did not predict the calculated and generated percentage of studies participants misrecalled favoring the opposite group from what the research showed (calculated: $\beta = .08$, $B = 0.47$, $SE = 0.32$, $t = 1.49$, $p = .14$; generated: $\beta = 0.07$, $B = 0.52$, $SE = 0.39$, $t = 1.32$, $p = .19$) but expected defensiveness did interact with research consistency (calculated: $\beta = 0.46$, $B = 1.54$, $SE = 0.64$, $t = 2.42$, $p = .02$; generated: $\beta = 0.46$, $B = 1.98$, $SE = 0.79$, $t = 2.52$, $p = .01$). Expected defensiveness in response to belief-inconsistent evidence was unrelated to misrecalling evidence favoring the opposite group for both the calculated, $\beta = -0.07$, $B = -0.41$, $SE = 0.49$, $t = -0.84$, $p = .40$, and generated percentage, $\beta = -0.08$, $B = -0.60$, $SE = 0.58$, $t = -1.04$, $p = .30$, 
measures. However, greater expected defensiveness in response to belief-consistent evidence was associated with misrecalling a greater percentage of studies favoring the opposite group on both the calculated, $\beta = .20$, $B = 1.13$, $SE = 0.41$, $t = 2.74$, $p = .007$, and generated, $\beta = .19$, $B = 1.38$, $SE = 0.53$, $t = 2.60$, $p = .01$, absolute bias measures.

There was a marginally significant interaction between expected effort critiquing the research and research consistency in predicting the generated percentage of studies participants recalled favoring the group indicated by the research, $\beta = 0.39$, $B = 1.57$, $SE = 0.89$, $t = 1.77$, $p = .077$. However, neither simple slope analysis for those presented with belief-consistent or belief-inconsistent evidence was statistically significant, $t$’s < 1.42, $p$’s > 0.15. All main effects and interactions for the other absolute bias measures were nonsignificant, $t$’s < 1.09, $p$’s ≥ 0.28.

Expected skepticism did not predict or interact with research consistency to predict any of the absolute bias measures, $t$’s < 1.19, $p$’s > 0.23.

**Post-assessment of bias (Perceived bias).** There was a marginally significant interaction between indirect self-reported bias at T2 and research consistency in predicting the calculated percentage of studies participants reported favoring the group indicated by the research, $\beta = -0.36$, $B = -1.45$, $SE = 0.82$, $t = -1.76$, $p < .08$, and a significant interaction in predicting the calculated percentage of studies participants misrecalled favoring the opposite group as shown by the research, $\beta = 0.48$, $B = 1.41$, $SE = 0.61$, $t = 2.33$, $p = .02$. Among participants presented with belief-consistent evidence, there was a tendency for greater perceptions that evaluations were influenced by pre-existing views to be associated with recalling a lower percentage of studies favoring the correct group, $\beta = -0.12$, $B = -0.80$, $SE = 0.48$, $t = -1.66$, $p < .10$, and misrecalling a
greater percentage of studies favoring the opposite group, $\beta = 0.13$, $B = 0.68$, $SE = 0.39$, $t = 1.75$, $p = .08$, but no effects reached statistical significance. All other main effects and interactions were nonsignificant for the absolute bias measures, $t's \leq 1.12$, $p's > 0.26$.

Neither perceived bias nor the interaction between perceived bias at T2 and research consistency predicted any of the absolute bias measures, $r's < 1.09$, $p's \geq 0.28$.

Perceived defensiveness marginally predicted the calculated percentage of studies participants reported favored the group indicated by the research, $\beta = 0.11$, $B = 0.84$, $SE = 0.47$, $t = 1.78$, $p < .08$. However, this effect was qualified by a marginally significant interaction between perceived defensiveness and research consistency, $\beta = -0.30$, $B = -1.84$, $SE = 1.00$, $t = -1.84$, $p < .07$. Among those presented with belief-inconsistent evidence, greater perceived defensiveness was associated with recalling a greater percentage of studies favoring the group indicated by the research, $\beta = 0.18$, $B = 1.46$, $SE = 0.63$, $t = 2.32$, $p = .02$. Perceived defensiveness was unrelated to recall among those presented with belief-consistent evidence, $\beta = -0.04$, $B = -0.39$, $SE = 0.75$, $t = -0.52$, $p = 0.61$. There was also a significant interaction between perceived defensiveness and research consistency in predicting the calculated percentage of studies participants misrecalled favoring the opposite group, $\beta = 0.41$, $B = 1.90$, $SE = 0.74$, $t = 2.55$, $p = .01$.

For those presented with belief-consistent evidence, greater perceived defensiveness was associated with misrecalling a greater percentage of studies favoring the opposite group (i.e., the outgroup), $\beta = -0.15$, $B = 1.28$, $SE = 0.61$, $t = 2.11$, $p = .036$. Perceived defensiveness was not significantly related to misrecall among those presented with belief-inconsistent evidence, $\beta = -0.12$, $B = -0.62$, $SE = 0.43$, $t = -1.45$, $p = 0.15$. All
main effects and interactions were nonsignificant for the other absolute bias measures, $|t|’s < 1.63, p’s > 0.10$.

There was a marginally significant interaction between perceived effort critiquing the research and research consistency in predicting the calculated percentage of studies participants recalled favoring the group indicated by the research, $\beta = 0.47, B = 1.80, SE = 0.97, t = 1.86, p < .07$. However, neither simple slope analysis for those presented with belief-consistent or belief-inconsistent evidence was statistically significant, $|t|’s < 1.53, p’s > 0.12$. No other main effects and interactions were significant for perceived effort, $r’s < 1.11, p’s > 0.26$.

Neither perceived skepticism nor the interaction between perceived skepticism at T2 and research consistency predicted either of the absolute bias measures, $|t|’s < 1.17, p’s > 0.24$.

**Relationships among subjective bias, absolute bias, and belief change**

To assess the relationships among subjective bias, absolute bias, and belief change, a series of regression analyses was performed. Research consistency was included in each analysis as a moderator. For these analyses, the recoded belief change variable was used, in which higher scores indicated greater belief change in the direction of what the research showed (i.e., more strongly believing that religiosity is more associated with positive life outcomes for those in the religion-enhancing condition and more strongly believing that religiosity is associated with negative life outcomes for those in the religion-disparaging condition).
Subjective bias and absolute bias. Neither subjective bias (i.e., research evaluations) nor the interaction between subjective bias and research consistency predicted either measure of absolute bias, t’s |< 0.94, p’s > .34.

Subjective bias and belief change. Subjective bias (i.e., research evaluations) predicted belief change, β = 0.20, B = 0.19, SE = 0.06, t = 3.35, p = .001. Participants who evaluated the research more favorably reported a stronger belief in what the research showed at T2 than at T1. Research consistency (belief-consistent vs. belief-inconsistent) also predicted how strongly participants believed in what the research found, β = -0.16, B = -0.56, SE = 0.20, t = -2.75, p = .006. Those presented with belief-consistent evidence reported less belief change in the direction of what the research showed than did those presented with belief-inconsistent evidence. The interaction between research consistency and subjective bias was nonsignificant, β = -0.18, B = -0.12, SE = 0.11, t = -1.02, p = 0.31.

Absolute bias and belief change. The percentage of studies participants recalled favoring the group indicated by the research was unrelated belief change, β = -0.01, B = 0.00, SE = 0.01, t = -0.24, p = .81. Recall did not interact with research consistency to predict belief change, β = 0.07, B = 0.01, SE = 0.01, t = -0.39, p = .70. The percentage of studies participants misrecalled favoring the opposite group did not predict belief change, β = -0.02, B = 0.00, SE = 0.01, t = -0.45, p = .65, but misrecall did interact with research consistency, β = -0.42, B = -0.04, SE = 0.02, t = -2.45, p = .02. Among those presented with belief-consistent evidence, misrecalling a greater percentage of studies favoring the opposite group than shown by the research was associated with less belief change in the direction of what the research found, β = -0.14, B = -0.02, SE = 0.01, t = -2.05, p = .04.
Misrecall was unrelated to belief change for those presented with belief-inconsistent evidence, \( \beta = 0.11, B = 0.02, SE = 0.01, t = 1.45, p = .15. \)

**Order of presenting pre-assessment of bias measures**

To examine whether presenting the inconsistent vs. consistent pre-assessment of bias items first affected participants’ expected defensiveness, effort critiquing the research, and skepticism, a series of two-way mixed model ANOVAs was performed, with pre-assessment order (inconsistent items first vs. consistent items first) included as a between-subjects factor and item topic (consistent vs. inconsistent) included as a within-subjects factor.

For expected effort critiquing the research, there was no main effect for pre-assessment order, \( F(1, 387) = 1.22, p = 0.27 \), but there was a main effect for item topic, \( F(1, 387) = 8.31, p = .004, d = 0.13 \). As stated in the main text, participants expected to exert slightly more effort critiquing studies that conflicted with \((M = 4.82, SD = 1.65)\) than supported \((M = 4.61, SD = 1.77)\) their views on religiosity and life outcomes. There was also a significant interaction between pre-assessment order x item topic, \( F(1, 387) = 6.87, p = .009, d = 0.12 \). Participants presented with the inconsistent questions first reported expecting to exert greater effort critiquing studies that conflict with \((M = 4.83, SD = 1.78)\) vs. support \((M = 4.42, SD = 1.87)\) their views, whereas those presented with the consistent questions first reported expecting to exert equally strong effort critiquing studies that support \((M = 4.79, SD = 1.65)\) and conflict with \((M = 4.81, SD = 1.52)\) their views.

For expected defensiveness, there were main effects for pre-assessment order, \( F(1, 387) = 15.04, p < .001, d = 0.33 \), and item topic, \( F(1, 387) = 47.06, p < .001, d = \)
0.35. Participants presented with the consistent questions first \((M = 3.08)\) reported greater expected defensiveness than did those presented with the inconsistent questions first \((M = 2.41)\). Participants also reported greater expected defensiveness for studies that conflict with \((M = 3.11, SD = 1.68)\) vs. support \((M = 2.50, SD = 1.76)\) their views. The pre-assessment order x item topic interaction was nonsignificant, \(F(1, 387) = 0.00, p = 0.95\).

For expected skepticism, there were also main effects for pre-assessment order, \(F(1, 387) = 13.67, p < .001, d = 0.29\), and item topic, \(F(1, 387) = 105.53, p < .001, d = 0.62\). Participants presented with the consistent questions first \((M = 3.84)\) reported greater expected skepticism than did those presented with the inconsistent questions first \((M = 2.79)\), and participants expected to be more skeptical of studies that conflicted with \((M = 3.84, SD = 1.75)\) than supported \((M = 2.80, SD = 1.60)\) their views. The pre-assessment order x item topic interaction was nonsignificant, \(F(1, 387) = 0.77, p = 0.38\).

**Correspondence of expected and perceived bias with actual bias**

When examining correspondence between subjective bias and the pre-assessment of bias process measures (i.e., effort critiquing, skepticism, and defensiveness), pre-manipulation responses to the inconsistent items were used for participants who were subsequently presented with belief-inconsistent evidence, and pre-manipulation responses to the consistent items were used for participants subsequently presented with belief-consistent evidence.

**Correspondence between expected defensiveness, effort critiquing, and skepticism and subjective bias.**
Neither expected defensiveness, $\beta = 0.03$, $B = 0.03$, $SE = 0.05$, $t = 0.66$, $p = 0.51$, nor the interaction between expected defensiveness and research consistency, $\beta = 0.18$, $B = 0.10$, $SE = 0.09$, $t = 1.13$, $p = 0.26$, predicted subjective bias.

Expected effort critiquing research did not predict subjective bias, $\beta = 0.07$, $B = 0.07$, $SE = 0.05$, $t = 1.46$, $p = 0.15$, but there was a marginally significant interaction between expected effort and research consistency, $\beta = 0.36$, $B = 0.18$, $SE = 0.09$, $t = 1.88$, $p = .06$. Among participants presented with belief-inconsistent evidence, expected effort critiquing the research was unrelated to subjective bias, $\beta = -0.03$, $B = -0.03$, $SE = 0.08$, $t = -0.37$, $p = 0.71$; however, among those presented with belief-consistent evidence, greater expectations to critique belief-consistent evidence predicted more favorable research evaluations, $\beta = 0.18$, $B = 0.15$, $SE = 0.06$, $t = 2.53$, $p = 0.01$.

Neither expected skepticism, $\beta = -0.05$, $B = -0.06$, $SE = 0.05$, $t = -1.17$, $p = 0.24$, nor the interaction between expected skepticism and research consistency, $\beta = 0.18$, $B = 0.11$, $SE = 0.10$, $t = 1.17$, $p = 0.25$, predicted subjective bias.

**Correspondence between perceived defensiveness, effort critiquing, and skepticism and subjective bias.**

Defensiveness was negatively associated with subjective bias, $\beta = -0.16$, $B = -0.17$, $SE = .05$, $t = -3.33$, $p = .001$; participants who reported feeling more defensive in response to the research evaluated the research less favorably. The interaction between defensiveness and research consistency was nonsignificant, $\beta = .20$, $B = 0.16$, $SE = 0.11$, $t = 1.54$, $p = .12$.

Perceived effort critiquing the research at T2 was associated with subjective bias, $\beta = .12$, $B = 0.13$, $SE = 0.05$, $t = 2.63$, $p = .009$; greater perceived effort critiquing the
research was associated with more favorable research evaluations. The perceived effort x research consistency interaction was nonsignificant, $\beta = .18$, $B = 0.09$, $SE = 0.10$, $t = 0.89$, $p = .37$.

Perceived skepticism at T2 was negatively associated with subjective bias, $\beta = -0.49$, $B = -0.48$, $SE = 0.04$, $t = -11.88$, $p < .001$; greater perceived skepticism was associated with evaluating the research more harshly. The perceived skepticism x research consistency interaction was nonsignificant, $\beta = .22$, $B = 0.14$, $SE = 0.08$, $t = 1.70$, $p = .09$.

**Correspondence between expected defensiveness, effort critiquing, and skepticism and absolute bias.** Expected defensiveness did not predict the percentage of studies participants recalled favoring the group indicated by the research, $\beta = -0.05$, $B = -0.36$, $SE = 0.39$, $t = -0.91$, $p = .36$, but there was a marginally significant interaction between defensiveness and research consistency, $\beta = -0.36$, $B = -1.45$, $SE = 0.79$, $t = -1.83$, $p < .07$. Expected defensiveness was unrelated to recall among those presented with belief-inconsistent evidence, $\beta = 0.07$, $B = 0.48$, $SE = 0.60$, $t = 0.79$, $p = .43$. However, there was a marginal relationship between expected defensiveness and recall among those presented with belief-consistent evidence, $\beta = -0.14$, $B = -0.91$, $SE = 0.52$, $t = -1.88$, $p < .07$, such that participants who expected to feel more defensive in response to belief-consistent evidence over-recalled a greater percentage of studies favoring the group indicated by the research (i.e., their in-group).

Similarly, expected defensiveness did not predict the percentage of studies participants misrecalled favoring the opposite group from what the research showed, $\beta = 0.07$, $B = 0.40$, $SE = 0.33$, $t = 1.23$, $p = .22$, but did interact with research consistency, $\beta =$
0.58, B = 1.96, SE = 0.66, t = 2.96, p = .003. Expected defensiveness in response to belief-inconsistent evidence was not significantly associated with misrecalling evidence favoring the opposite group, β = -0.12, B = -0.73, SE = 0.51, t = -1.42, p = .16. However, greater expected defensiveness in response to belief-consistent evidence was associated with misrecalling a greater percentage of studies favoring the opposite group, β = .22, B = 1.24, SE = 0.43, t = 2.91, p = .004.

Neither expected effort critiquing the research, expected skepticism, nor their interactions with research consistency, predicted either absolute bias measure, t’s < 1.25, p’s > 0.21.

**Correspondence between perceived defensiveness, effort critiquing, skepticism and absolute bias.** Perceived defensiveness marginally predicted the percentage of studies participants reported favoring the group indicated by the research, β = 0.11, B = 0.78, SE = 0.44, t = 1.77, p < .08. However, this effect was qualified by an interaction between perceived defensiveness and research consistency, β = -0.33, B = -1.86, SE = 0.94, t = -1.99, p < .05. Among those presented with belief-inconsistent evidence, greater perceived defensiveness was associated with recalling a greater percentage of studies favoring the group indicated by the research, β = 0.21, B = 1.36, SE = 0.52, t = 2.63, p = .009. Perceived defensiveness was unrelated to recall among those presented with belief-consistent evidence, β = -0.05, B = -0.51, SE = 0.79, t = -0.64, p = 0.52. There was also a significant interaction in predicting the percentage of studies participants misrecalled favoring the opposite group, β = 0.36, B = 1.70, SE = 0.79, t = 2.13, p = .03. For those presented with belief-inconsistent evidence, greater perceived defensiveness was marginally associated with misrecalling a lower percentage of studies.
favoring the opposite group (i.e., their ingroup), $\beta = -0.15$, $B = -0.80$, $SE = 0.45$, $t = -1.79$, $p = .075$. Perceived defensiveness was not significantly related to misrecall among those presented with belief-consistent evidence, $\beta = 0.10$, $B = 0.89$, $SE = 0.66$, $t = 1.36$, $p = 0.18$.

Perceived effort critiquing the research did not predict absolute bias on the recall measure, $\beta = 0.02$, $B = 0.19$, $SE = 0.45$, $t = 0.41$, $p = 0.68$. However, perceived effort critiquing the research interacted with research consistency to predict the percentage of studies participants recalled favoring the group indicated by the research, $\beta = 0.53$, $B = 1.81$, $SE = 0.90$, $t = 2.01$, $p < .05$. However, neither simple slope analysis for those presented with belief-consistent or belief-inconsistent evidence was statistically significant, $|t|$’s < 1.68, $p$’s ≥ 0.10. Neither perceived effort nor its interaction with research consistency predicted absolute bias on the misrecall measure, $|t|$’s < 1.25, $p$’s > 0.21.

Neither perceived skepticism nor the interaction between perceived skepticism and research consistency predicted either absolute bias measure, $|t|$’s < 0.59, $p$’s > 0.55.

**Correspondence between expected defensiveness, effort critiquing, and skepticism belief change.**

Expected defensiveness was unrelated to belief change, $\beta = 0.00$, $B = 0.00$, $SE = 0.05$, $t = 0.02$, $p = .99$, but there was an interaction between expected defensiveness and research consistency, $\beta = -0.36$, $B = -0.21$, $SE = 0.10$, $t = -1.99$, $p = .048$. However, neither simple slope analysis for those presented with belief-consistent or inconsistent evidence reached statistical significance, $|t|$’s < 1.46, $p$’s > 0.14.
Neither expected effort critiquing the research, $\beta = -0.02$, $B = -0.02$, $SE = 0.05$, $t = -0.36$, $p = 0.72$, nor the interaction between expected effort and research consistency, $\beta = -0.15$, $B = -0.07$, $SE = 0.11$, $t = -0.68$, $p = 0.50$, predicted belief change.

Expected skepticism was marginally associated with belief change, $\beta = -0.09$, $B = -0.09$, $SE = 0.05$, $t = -1.70$, $p = 0.09$, such that greater expected skepticism was associated with less belief change. There was no expected skepticism x research consistency interaction, $\beta = -0.02$, $B = -0.01$, $SE = 0.11$, $t = -0.10$, $p = 0.92$.

**Correspondence between perceived defensiveness, effort critiquing, and skepticism belief change.**

None of the post-assessment of bias measures predicted, or interacted with research consistency to predict, belief change, $|t|$’s $< 1.17$, $p$’s $> 0.24$. 
References


