

**Bound Together for God and Country: The Binding Moral Foundations Link
Unreflectiveness with Religiosity and Political Conservatism**

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Abstract

Existing work suggests links between analytic cognitive style, endorsement of the binding moral foundations prioritizing sanctity, loyalty, and respect for authority, and individual differences in religiosity and conservatism. Yet, it remains unclear how these variables interrelate. In three new studies and a reanalysis of an open dataset, we find evidence that people who engage in less analytical thinking tend to endorse the binding (but not individualizing) moral foundations, which in may turn lead them to endorse various elements of religiosity and conservatism—including a) belief in God, b) intrinsic religious motivation, c) auxiliary religious beliefs (i.e., religious beliefs other than theism), d) reportedly engaging in religious practices, e) identification as politically conservative, and f) endorsement of both socially and fiscally conservative positions on political issues. These findings align with theories suggesting lower analytic cognitive style may be useful in socially dense environments where group cohesion is paramount. However, results do not rule out alternative frameworks, such as those treating moral values as a downstream product of political and religious attitudes.

Keywords: cognitive style, moral foundations, religiosity, theism, conservatism

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Recent work links analytic cognitive style (ACS) with decreased religiosity and conservatism. People low in analytic thinking experience greater intrinsic and extrinsic religious motivation (Bahçekapili & Yilmaz, 2017), endorse more religious beliefs (Pennycook, Ross, Koehler, & Fugelsang, 2016), and engage in more religious activity (Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2014b). Similarly, people low in ACS skew politically conservative, especially on social rather than economic issues (e.g., Deppe et al., 2015; Yilmaz & Saribay, 2016).¹ Researchers have examined various mechanisms contributing to this effect, including detecting conflicting beliefs (Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2014a), depth of processing (Eidelman, Crandall, Goodman, & Blanchar, 2012), and motivated processing (Jost, Glaser, Kruglanski, & Sulloway, 2003).

In the current work, we explore an additional possibility: Low ACS facilitates endorsement of moral intuitions that contribute to increased group cohesion, a moral substrate common to both religiosity and conservatism. Religious and conservative people focus on ingroup loyalty, respect for authority, and sanctity, the so-called *binding moral foundations* (e.g., Graham et al., 2011; Graham, Haidt, & Nosek, 2009; Haidt & Graham, 2007), more than their liberal or non-religious peers. Conversely, liberal and non-religious people prioritize the *individualizing foundations*—harm and fairness—though conservative and religious people also value these domains. Hence, political and religious disagreement over moral issues often reflects differences in the binding foundations—which may partially explain the link between analytical processing, religiosity, and conservatism. We propose that people who are low on ACS—i.e.,

¹ Most findings demonstrate this effect, but there are a variety of exceptions (e.g., Kahan, 2013; Yilmaz & Saribay, 2017a, 2017b).

people less likely to question intuition—should tend to endorse the binding but not individualizing foundations, and therefore score highly on measures of religiosity and conservatism. The current paper tests this possibility.

Analytical Cognitive Style

Analytical cognitive style refers to the ability and willingness to override prepotent intuitive responses by engaging in careful, controlled cognitive deliberation (e.g., Pennycook, Fugelsang, & Koehler, 2015). Researchers often measure ACS via the Cognitive Reflection Test (CRT; Frederick, 2005), which lures decision-makers with intuitive—but incorrect—answers: e.g., “If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?” Although the answer *100 minutes* seems intuitive, the correct answer is actually *5 minutes*. Generating correct answers on CRT items requires actively calculating the correct answer, rather than relying on intuition.

Like other individual differences, CRT performance appears relatively stable over time (Stagnaro, Pennycook, & Rand, 2018). It predicts various metrics of cognitive processing, including set shifting, working memory capacity, numeracy, resistance to heuristics, active open-minded thinking, and intelligence (e.g., Frederick, 2005; Liberali, Reyna, Furlan, Stein, & Pardo, 2012; Baron, Scott, Fincher, & Metz, 2015). Importantly, CRT performance has explanatory power above and beyond general cognitive ability or executive function (Toplak, West, & Stanovich, 2011), suggesting the CRT captures more than mere *ability*—CRT also captures *willingness* to engage in analytic thinking (Pennycook et al., 2015; Toplak, West, & Stanovich, 2014).

Cognitive Style Predicts Religiosity and Conservatism

Recent work links analytic cognitive style to both religiosity and political conservatism. For example, a meta-analysis of ~15,000 participants (Pennycook et al., 2016) indicated that CRT performance correlates negatively with theism—the explicit belief in the existence of one or more divine beings.² Moreover, low CRT performance predicted a variety of other aspects of religiosity, including internally- and externally-oriented religious motivations (Bahçekapili & Yilmaz, 2017) and religious practices, although some of these findings did not hold when also controlling for belief, suggesting that religious belief is key (Pennycook et al., 2014b). Moreover, intelligence correlates negatively with religiosity (e.g., Bertsch & Pesta, 2009; Lynn, Harvey, & Nyborg, 2009)—in particular, less intelligent people score higher on fundamentalism, religious identification, and religious practice, but not mindfulness, spirituality, and private religious practice (Lewis, Ritchie, & Bates, 2011). Conversely, atheism is associated with skeptical, rational, and intellectual approaches to the world (Beit-Hallahmi, 2006; Caldwell-Harris, Wilson, LoTempio, & Beit-Hallahmi, 2011), and atheism predicts intelligence across individuals (Zuckerman, Silberman, & Hall, 2013) and societies (Lynn et al., 2009).

Similarly, decreases in ACS are associated with increases in political conservatism. CRT performance predicts conservatism in both U.S. and Turkish samples—though primarily social not economic conservatism (e.g., Pennycook et al., 2014b; Yilmaz & Saribay, 2016). Moreover, evidence from the 2016 U.S. Presidential Election largely affirmed this pattern among voters (Pennycook & Rand, 2019). Conservatives also typically score higher on dogmatism and intolerance of ambiguity (Jost et al., 2003), need for cognitive closure (Chirumbolo, Areni, & Sensales, 2004), and resistance to change (Jost et al., 2003). Conversely, liberals typically score

² Recent cross-cultural work by Gervais and colleagues (2018) suggests that this effect might be more modest than previously thought and specific to highly religious countries, though similar work by Stagnaro, Ross, Pennycook, and Rand (2019) suggests that such a conclusion is premature.

higher than conservatives on deliberative analytical thinking (Jost et al., 2003), need for cognition (Sargent, 2004), SAT and analogic reasoning questions, mathematics, and reading achievement (Stankov, 2009). Even congressional speeches by liberal (versus conservative) U.S. Senators are higher in integrative complexity (Tetlock, 1983). Thus, deliberative analytic thinking differs along religious and political lines.

Religiosity and Conservatism Prioritize the Binding Moral Foundations

Researchers have explored mechanisms to explain the impact of analytic cognitive style on religiosity and conservatism, such as detecting conflicts between different beliefs (Pennycook et al., 2014a), engaging in deep versus shallow processing (Eidelman et al., 2012), and relying on motivated processing (Jost et al., 2003). Although each of these factors may play a role, much variance remains unexplained. Instead, we focus on the common moral underpinnings of religious and political worldviews (e.g., Haidt, 2012; Lakoff, 2010). Religiosity and conservatism share a common moral substrate facilitated by low analytical thinking, which may partially explain the link between ACS and these constructs: moral intuitions regarding aspects of morality that bind together social groups—the binding foundations of moral foundations theory (e.g., Graham et al., 2013; Haidt & Joseph, 2004).

Moral foundations theory emerged from Haidt's (2001) seminal work suggesting that moral judgments primarily reflect *moral intuitions*—valenced moral evaluations that appear in consciousness without awareness of the evaluation process. Moral foundations theory expanded this argument by proposing a typology of intuitions pertaining to different aspects of morality (e.g., Graham et al., 2013; Haidt & Joseph, 2004). *Harm* and *fairness* comprise the *individualizing foundations*, which focus on issues such as universal human rights. Conversely,

loyalty, respect for authority, and sanctity comprise the *binding foundations*, which focus on issues pertaining social order and group cohesion, respecting tradition and group norms.

Moral foundation endorsement cleaves along political and religious lines. Liberals focus almost exclusively on the individualizing foundations of harm and care, whereas conservatives endorse all five foundations to some degree, and particularly endorse the binding domains of loyalty, respect for authority, and sanctity (Graham et al., 2009; Haidt & Graham, 2007). Hence, conservatives score higher than liberals on constructs related to the binding foundations, such as disgust sensitivity (e.g., Inbar, Pizarro, Iyer, & Haidt, 2012) and disapproval of nontraditional sexual practices (Koleva, Graham, Iyer, Ditto, & Haidt, 2012). People higher in religiosity demonstrate a similar pattern of moral foundation endorsement: Although they care about all five foundations, they particularly prioritize the binding foundations (Graham & Haidt, 2010; Piazza & Landy, 2013). These patterns emerge even in open-ended reports of real-world moral considerations (Hofmann, Wisneski, Brandt, & Skitka, 2014). Together, these findings suggest people high in religiosity and conservatism prioritize the binding moral foundations.

Moral Foundations Explain the Link Between ACS, Religiosity, and Conservatism

Thus far, we have reviewed findings demonstrating that analytic cognitive style predicts religiosity and conservatism, and people higher in these constructs also prioritize the binding moral foundations. We propose that these parallel patterns are no coincidence—they emerge in part because people lower in ACS are more likely to endorse the binding foundations, and therefore score higher in religiosity and conservatism. Moreover, as there is more widespread endorsement of the individualizing foundations across the religious and political spectra, it is unlikely differences in endorsement of the individualizing foundations would explain the link

between ACS, religiosity, and conservatism. Theory and evidence from past work supports this possibility.

Theorists have argued that lower ACS may be useful in social environments linked to religiosity and conservatism. For example, religious and conservative communities tend to be higher in social density than secular or liberal communities (e.g., Haidt, 2012; Morgan, Wood, & Caldwell-Harris, 2018). Unlike population density, which tracks individuals across physical spaces, social density tracks the density and intensity of the web of social connections between people. In other words, in high social density environments, people frequently interact with the same people, and those they interact with likewise know one another—i.e., ‘everyone knows everyone’ (e.g., a small town; a tight-knit religious community). Conversely, in low social density environments people interact with clusters of people who may not know one another (e.g., rotating social interaction between colleagues and personal friends, who do not interact with one another). Importantly, high social density communities are defined by features—tight adherence to social norms, interdependent construal of the self, and respect for authority—aligning with the binding moral foundations: loyalty, authority, and sanctity (Haidt & Graham, 2007). In such tight knit communities, it can be advantageous to unquestioningly align oneself with widely-shared assumptions and social mores, and disadvantageous to critically examine such assumptions (Morgan et al., 2018). Such questioning may disrupt the status quo, and disruptions are likely to ripple to one’s entire social network. Therefore, lower ACS may be advantageous in socially dense environments, such as conservative and religious communities.

Indeed, Pennycook and colleagues (2014b) found that CRT scores predicted reduced binding (but not individualizing) endorsement. Religiosity demonstrated a similar pattern, as did both social and fiscal conservatism. Moreover, Ward and King (2018) found that people who

self-report trusting their intuitions (which was negatively related to CRT performance) were more likely to endorse the binding foundations, as well as score higher on religiosity and (sometimes) conservative political orientation. Likewise, Royzman, Landy, and Goodwin (2014) measured CRT performance and moralization of harm/fairness (e.g., stealing, forgery) or sanctity (incest) violations. Participants moralized stealing and forgery, regardless of CRT performance, but only people scoring low on the CRT moralized incest. Thus, CRT performance predicted reactions to violations of the binding but not individualizing foundations (see Landy, 2016).

The Current Work

In sum, evidence suggests people who eschew deliberation in favor of intuition (i.e., low in ACS) tend to endorse the binding moral foundations, and score higher on measures of religiosity (theism, religious belief, or religious participation) and conservatism. Therefore, in the current work, we present three new studies and a reanalysis of existing data examining whether endorsement of the binding (but not individualizing) foundations significantly mediated the impact of CRT performance on both religiosity and conservatism. Study 1 established the basic effect in an online sample. Study 2 extended this analysis to a different moral foundation measure. Study 3 examined a student sample. Finally, Study 4 examined whether this finding held in previously published dataset (Pennycook et al., 2014b). Study 4 also allowed us to separately examine measures of religious beliefs and participation, and measures of social and economic conservatism. Data and materials for Studies 1-3 are available at [https://osf.io/y35w9/?view_only=345d37b114c946ba8202eb5d4c391016], and data for Study 4 are available at osf.io/uhqf9.

Study 1

In Study 1 we assessed analytical cognitive style, moral foundations endorsement,

theism, and conservatism. Past work suggests endorsement of the binding, but not individualizing, foundations should carry significant indirect variance from CRT performance to theism and conservatism.

Method

Participants. We decided a priori to collect around 150 participants based on similar work (e.g., Gervais & Norenzayan, 2012a). In 2012, we recruited 151 participants in a single run on Amazon's Mechanical Turk.³ We decided a priori to exclude all participants who failed any of three catch questions: two standard non-moral questions on the Moral Foundations Questionnaire (e.g., "What is the moral relevance of math achievement?"), and an instructional attention check (Oppenheimer, Meyvis, & Davidenko, 2009). Thus, we excluded 12 participants⁴ for a final sample of 139 (80 women, 59 men, $M_{\text{age}}=35.47$, $SD=11.76$). A majority of participants identified as White/Caucasian (76%), Christian (40%) or atheist/agnostic (32%). On average, they rated themselves slightly above the mid-point on a 10-point subjective socioeconomic status (SES) ladder of the United States ($M=6.22$, $SD=1.68$).

Procedure. Participants completed the Cognitive Reflection Test (Frederick, 2005), three mathematical problems with incorrect intuitive answers and correct analytic answers. We summed correct responses ($\alpha=.79$). Performance varied: 39% scored 0, 15% scored 1, 20% scored 2, and 26% scored 3, a typical result (Frederick, 2005). Next, ostensibly as part of a different study, participants completed the 30 Moral Foundations Questionnaire items (MFQ; Graham et al., 2011) on 6-point scales where higher values indicate greater endorsement. The

³ Although non-naivety of MTurk participants is a concern, particularly regarding the CRT where prior exposure may improve performance (Stieger & Reips, 2016), recent research suggests that the predictive power of the CRT is not attenuated after multiple exposures, despite overall improvement in performance (Bialek & Pennycook, 2018).

⁴ Results are similar when retaining them.

MFQ items cluster into five sub-scales grouped into two overarching factors: binding (sanctity, loyalty, and authority, $\alpha=.83$) and individualizing (harm and fairness, $\alpha=.76$). Following Gervais and Norenzayan (2012b), participants reported theism by describing their belief in God on a scale from 0 (*God definitely does not exist*) to 100 (*God definitely exists*, $M=52.37$, $SD=41.86$, Gervais & Norenzayan, 2012b), and intrinsic religiosity using Hoge's (1972) 10-item measure. Participants also reported political orientation on a scale anchored at *very liberal* (1) and *very conservative* (7), with most scoring towards the liberal end of the spectrum ($M=2.92$, $SD=1.62$).

Analytic strategy. For this and all studies in this paper, we analyzed parallel mediation models testing our primary hypothesis that the binding—but not individualizing—foundations would carry significant variance between analytic cognitive style and religiosity, as well as analytic cognitive style and political conservatism.⁵ To maximize power, we interpreted significance of indirect effects based on bias-corrected confidence intervals bootstrapped to 10,000 iterations (Hayes & Scharkow, 2013).⁶ Our studies employ measures on different scales, so we employed fully standardized indirect effects to maximize interpretability and because simulations suggest this approach is superior to other common approaches for two-mediator parallel models (Miočević, O'Rourke, MacKinnon, & Brown, 2018). All models employed listwise deletion, so we note where model-specific n 's differ from study-level n 's. In Studies 1-3, we used the PROCESS macro in SPSS (Model 4; Hayes, 2013) for analysis; in Study 4, we used path models in Mplus 8 (Muthén & Muthén, 1998-2017), to simultaneously model religious

⁵ For all studies in this paper, we focus on analyses of the higher-order moral foundation factors—binding and individualizing (see Graham et al., 2011). We chose this approach because parallel mediation analyses assess unique variance between mediators and the outcome variable, which might mask shared relationships between foundations and religiosity/conservatism (e.g., common variance between authority and loyalty predicting increased conservatism). In the online supplement, we report results from mediation models modeling the foundations as five parallel mediators for Studies 1-3 (Figures S1-S3).

⁶ In order to compute reproducible bootstrap estimates, we manually set the seed to an arbitrary value, which we used for all mediation analyses.

belief and participation, and social and fiscal conservatism.

Results and Discussion

Correlational analyses revealed that CRT scores correlated negatively with theism, political conservatism, and overall endorsement of the binding moral foundations (as well as with each binding foundation separately, see Table 1). The mediation model examining theism ($n=139$) revealed that CRT performance negatively predicted endorsement of the binding foundations, $B=-.32$, $SE=.08$, $p<.001$ but not the individualizing foundations, $B=.11$, $SE=.09$, $p=.202$ (see Figure 1a). In turn, binding foundation endorsement predicted greater theism, $B=.40$, $SE=.08$, $p<.001$, but individualizing foundation endorsement did not, $B=.05$, $SE=.08$, $p=.516$. As expected, there was a significant indirect effect of CRT performance through binding, $B=-.13$, $SE=.04$, $CI_{95\%}[-.216, -.063]$, but not individualizing, $B=.01$, $SE=.01$, $CI_{95\%}[-.009, .050]$, and these two indirect effects were significantly different, $Diff_B=-.132$, $SE=.04$, $CI_{95\%}[-.220, -.066]$. In the presence of these mediators, CRT performance did not significantly predict theism, $B=-.13$, $SE=.08$, $p=.107$. This pattern held when controlling for age, gender, and SES. We obtained a similar pattern when examining intrinsic religiosity instead of theism (Figure 1b): the indirect effect of CRT performance on religiosity was significant through endorsement of the binding, $B=-.15$, $SE=.04$, $CI_{95\%}[-.239, -.081]$, but not individualizing foundations, $B=.01$, $SE=.01$, $CI_{95\%}[-.005, .048]$, and these effects were significantly different, $Diff_B=-.160$, $SE=.04$, $CI_{95\%}[-.249, -.091]$. The direct effect remained significant, $B=-.16$, $SE=.08$, $CI_{95\%}[-.247, -.088]$. Again, controlling for age, gender, and SES did not affect these results.

Next we examined whether endorsement of the binding and individualizing foundations carried variance between CRT scores and political conservatism (Figure 1c). In this model ($n=139$), CRT performance negatively predicted endorsement of the binding, $B=-.32$, $SE=.08$,

$p < .001$, but not the individualizing foundations, $B = .11$, $SE = .09$, $p = .202$. In turn, binding foundation endorsement predicted greater conservatism, $B = .30$, $SE = .08$, $p < .001$, and individualizing foundation endorsement predicted lower conservatism, $B = -.20$, $SE = .08$, $p = .011$. As expected, there was a significant indirect effect of CRT performance through binding, $B = -.09$, $SE = .04$, $CI_{95\%}[-.184, -.035]$, but not individualizing foundations, $B = -.02$, $SE = .02$, $CI_{95\%}[-.081, .008]$, but these two indirect effects were not significantly different, $Diff_B = -.072$, $SE = .05$, $CI_{95\%}[-.169, .007]$. In the presence of these mediators, CRT performance marginally predicted lower conservatism, $B = -.15$, $SE = .08$, $p = .075$. This pattern largely held controlling for age, gender, and SES, except the difference between the indirect effects became statistically significant. Together, results corroborated the prediction that endorsement of the binding, but not individualizing, foundations mediates significant variance between lower reflectiveness and both religiosity and conservatism.

Table 1

Means, Standard Deviations, and Correlations between Key Variables in Study 1

Key Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Mean	20.71	18.65	22.06	21.15	27.87	28.26	27.51	1.37	2.92	52.37	33.57	35.47	.42	6.22
SD	5.66	7.92	5.50	5.96	4.23	4.77	4.73	1.24	1.62	41.86	15.31	11.76	-	1.68
1. Binding		.89***	.89***	.83***	.09	.18*	-.04	-.32***	.33***	.45***	.54***	.07	-.01	-.16
2. Sanctity			.70***	.54***	.12	.21*	-.02	-.31***	.34***	.58***	.70***	.09	-.13	-.17*
3. Authority				.67***	.05	.09	-.01	-.32***	.28***	.35***	.42***	.00	-.01	-.13
4. Loyalty					.04	.16	-.07	-.19*	.28**	.20*	.24**	.05	.06	-.09
5. Individualizing						.90***	.90***	.11	-.20*	.07	.10	.06	-.15	.07
6. Harm							.61***	.03	-.05	.20*	.22*	.08	-.19*	.05
7. Fairness								.19*	-.29**	-.07	-.04	.04	-.07	.09
8. CRT									-.27**	-.25**	-.30***	.14	.01	-.63
9. Conservatism										.27**	.34***	.06	.11	.06
10. Theism											.71***	.06	-.23**	-.06
11. Intrinsic religiosity												.10	-.17*	-.05
12. Age													.00	-.01
13. Gender (0=w, 1=m)														.07
14. Subjective SES														

Note: *= $p < .05$, **= $p < .01$, ***= $p < .001$.

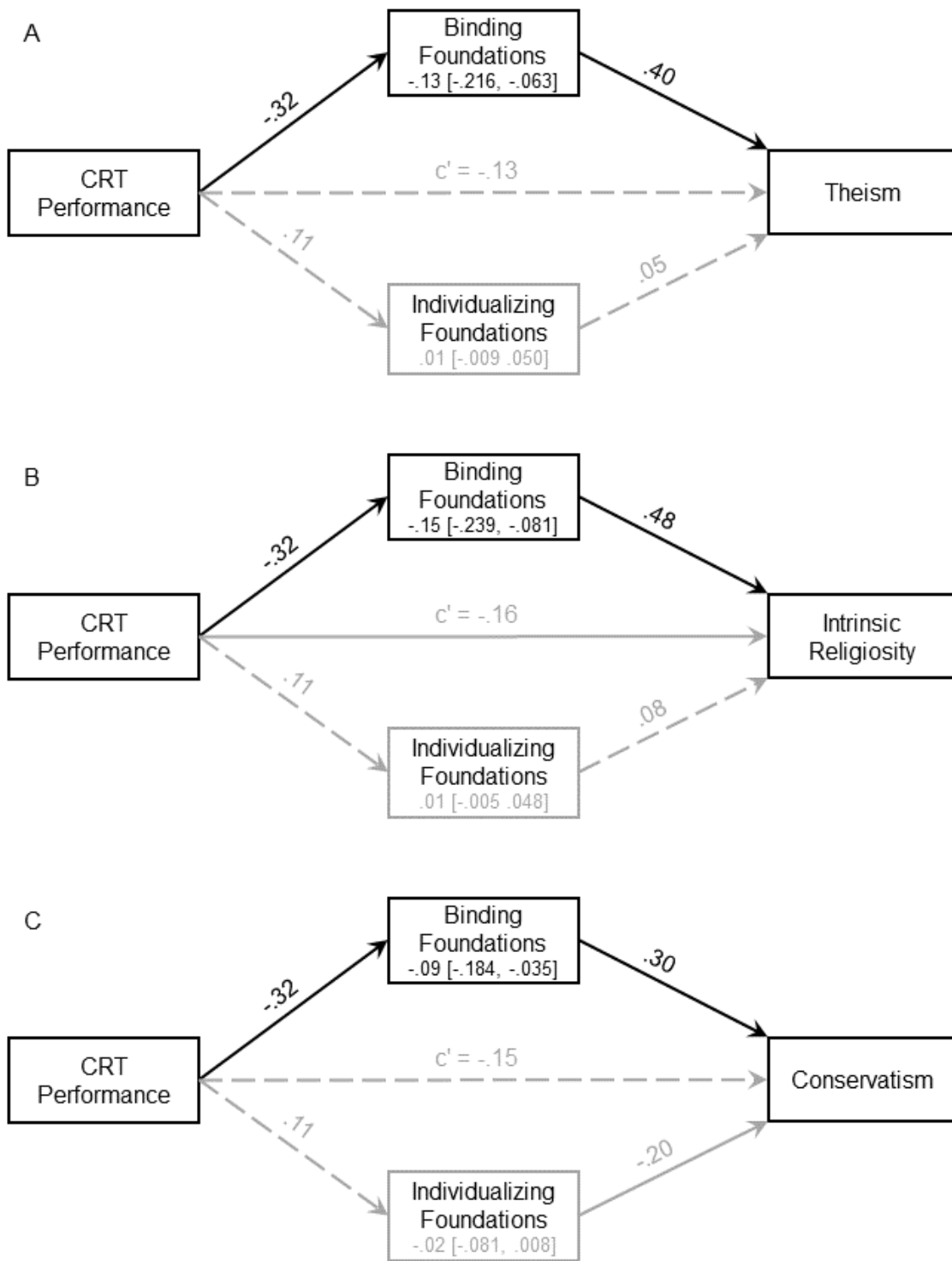


Figure 1. In Study 1, endorsement of the binding, but not individualizing, moral foundations mediated the relationships between Cognitive Reflection Test performance and theism (Panel A),

intrinsic religiosity (Panel B), and political conservatism (Panel C). All regression coefficients are fully standardized. Solid lines indicate significant paths in the model; dashed lines indicate nonsignificant paths. Significant indirect effects are in black, nonsignificant indirect effects are in grey.

Study 2

In Study 2, we examined whether Study 1 patterns would replicate using the Moral Foundations Sacredness Scale (MFSS; Graham & Haidt, 2012). We anticipated that, consistent with Study 1, valuing the binding but not individualizing foundations would carry significant variance from CRT performance to conservatism (we did not assess religiosity in this study).

Method

Participants. We again decided a priori to collect about 150 participants in a single MTurk run with no stopping in 2012. We obtained 153 participants, but applied a priori exclusion criteria to exclude participants ($n=2$) who failed either of two attention checks (the MFSS contains no catch questions).⁷ Thus, our final sample was 151 (83 men, 68 women, $M_{\text{age}}=31.88$, $SD=10.72$). Most participants identified as White/Caucasian (69%) and Christian (42%) or Atheist/Agnostic (42%). Participants averaged slightly above the midpoint on the U.S. subjective socioeconomic ladder ($M=5.69$, $SD=1.85$), and slightly below the midpoint on political orientation ($M=3.24$, $SD=1.51$).

Procedure. Participants first completed the CRT, achieving similar performance to Study 1: 39.1% scored 0, 15.9% scored 1, 16.6% scored 2, and 28.5% scored 3. Next, participants completed the Moral Foundations Sacredness Scale (MFSS; Graham & Haidt, 2012), which involves imagining secretly and anonymously performing acts violating each foundation. For example, sticking a pin into the hand of a child violates the harm foundation; cursing one's parents to their face violates the authority foundation; receiving a blood transfusion from a child molester violates the sanctity foundation. Participants reported how much money it would take to convince them to perform each violation, ranging from \$0 (scored as 1) to *Never for any amount*

⁷ Again, results are similar using the full sample.

of money (scored as 8). Thus, in contrast to the MFQ used in Study 1, the MFSS does not tap explicit endorsement of moral foundations, but rather expressed unwillingness to violate the various foundations for increasing payoffs. We calculated MFSS scores separately for each foundation: sanctity ($\alpha=.70$), loyalty ($\alpha=.71$), authority ($\alpha=.79$), harm ($\alpha=.80$) and fairness ($\alpha=.74$). We then calculated the higher-order measures of the binding ($\alpha=.86$) and individualizing ($\alpha=.86$) factors.

Results and Discussion

Consistent with Study 1, CRT performance correlated negatively with conservatism and overall unwillingness to violate the binding foundations (and each binding foundation separately), and did not significantly correlate with unwillingness to violate the individualizing foundations overall (or any individualizing foundation separately, see Table 2).

We again computed mediation models to examine whether unwillingness to violate the binding but not individualizing foundations would carry significant variance between CRT performance and political conservatism, as in Study 1 (Figure 2, $n=148$). Indeed, CRT performance negatively predicted unwillingness to violate the binding, $B=-.27$, $SE=.08$, $p=.001$, but not the individualizing foundations, $B=-.14$, $SE=.08$, $p=.087$. In turn, unwillingness to violate binding foundations predicted greater conservatism, $B=.39$, $SE=.11$, $p<.001$, whereas unwillingness to violate individualizing foundations did not, $B=-.11$, $SE=.11$, $p=.313$. Moreover, there was a significant indirect effect of CRT performance through binding, $B=-.10$, $SE=.04$, $CI_{95\%}[-.205, -.039]$, but not individualizing foundations, $B=.02$, $SE=.02$, $CI_{95\%}[-.008, .074]$, and these two indirect effects were significantly different, $Diff_B=-.117$, $SE=.06$, $CI_{95\%}[-.266, -.038]$. In the presence of these mediators, the direct effect of CRT performance on conservatism was not significant, $B=-.11$, $SE=.08$, $p=.157$. This pattern held when controlling for age, gender, and

SES ($n=146$).

Hence, overall findings corroborated Study 1 using a different moral foundations measure. However, Studies 1 and 2 both employed internet samples, and this study did not assess religiosity. Thus we next examined whether the Study 1 findings would replicate in a student sample.

Table 2

Means, Standard Deviations, and Correlations between All Variables in Study 2

Variables	1	2	3	4	5	6	7	8	9	10	11	12
Mean	5.66	6.06	4.87	6.04	6.24	6.76	5.72	1.34	3.24	31.88	.55	5.69
SD	1.28	1.46	1.72	1.37	1.25	1.29	1.43	1.26	1.51	10.72	-	1.85
1. Binding		.81***	.86***	.86***	.68***	.60***	.65***	-.26**	.34***	.18*	-.20*	.11
2. Sanctity			.49***	.58***	.55***	.57***	.46***	-.30***	.39***	.15	-.28***	.05
3. Authority				.64***	.61***	.46***	.65***	-.17*	.21*	.14	-.12	.10
4. Loyalty					.56***	.50***	.53***	-.20*	.28***	.17*	-.13	.14
5. Individualizing						.91***	.93***	-.14	.17*	.28***	-.32***	.02
6. Harm							.69***	-.15	.20*	.25**	-.41***	.03
7. Fairness								-.11	.12	.26**	-.19*	.00
8. CRT										-.18*	.18*	-.02
9. Conservatism										.19*	.02	.15
10. Age											-.15	-.12
11. Gender (0=w, 1=m)												.03
12. SES												

Note: *= $p < .05$, **= $p < .01$, ***= $p < .001$.

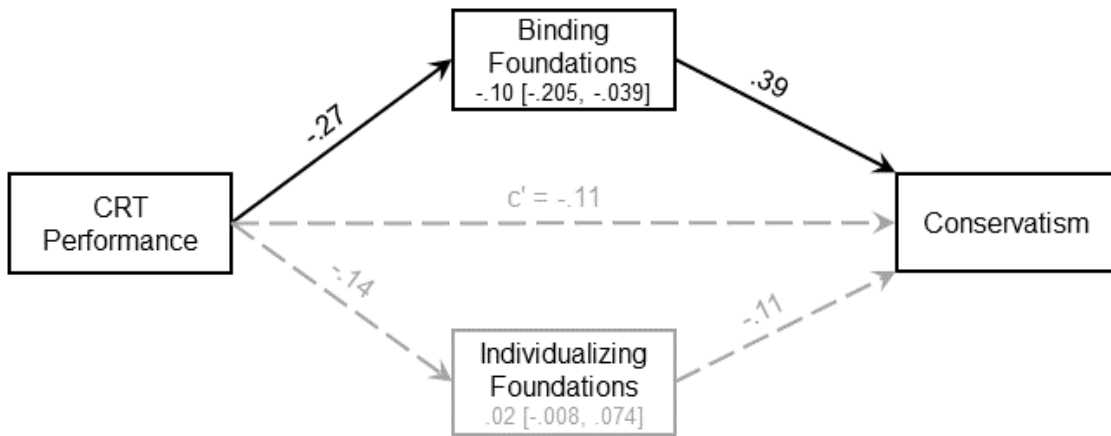


Figure 2. In Study 2, endorsement of the binding, but not individualizing, moral foundations mediated the relationship between Cognitive Reflection Test performance and political conservatism. All regression coefficients are fully standardized. Solid lines indicate significant paths in the model; dashed lines indicate nonsignificant paths. Significant indirect effects are in black, nonsignificant indirect effects are in grey.

Study 3

Studies 1 and 2 demonstrated the analytic cognitive style predicted both theism and conservatism via the binding (but not individualizing) foundations. Yet, both studies employed online samples, which, compared to student samples, typically have fewer conservative and religious people (Berinsky, Huber, & Lenz, 2012; Paolacci & Chandler, 2014), and superior CRT performance (Chandler, Mueller, & Paolacci, 2014). Therefore, we examined the same measures as Study 1 (except subjective SES) in a student sample at a large university in the Southern United States. This study also included responses to a moral dilemma battery (Conway & Gawronski, 2013), though these findings were not directly relevant to the current analyses, so we relegated them to the online supplement.

Method

Participants. To increase power, we increased sample size to around 200, ultimately recruiting 208 students for partial course credit in a single run. We again excluded all participants who failed either of the MFQ catch questions ($n=22$), as well as all participants who skipped more than two consecutive MFQ questions ($n=3$).⁸ This left a final sample of 183 participants (112 females, 71 males, $M_{\text{age}}=19.13$, $SD=1.36$). The majority of our sample identified as White (77%) and Christian (80%), scored high in theism ($M=80.22$, $SD=32.46$; out of 100), and scored slightly above the midpoint on political conservatism ($M=4.22$, $SD=1.44$). We decided a priori to increase the sample size from Studies 1 and 2 as we measure additional variables.

Procedure. Again, participants completed the Cognitive Reflection Test, performing worse than in Studies 1 and 2: 65.3% scored 0, 22.4% scored 1, 7.1% scored 2, and 5.1% scored

⁸ Again, results were similar using the full sample. Due to experimenter oversight, we failed to include an instructional manipulation check in this study.

3. Additionally, participants completed the MFQ as in Study 1. Subscales showed adequate internal consistency: binding $\alpha=.85$, individualizing $\alpha=.73$, sanctity $\alpha=.74$, loyalty $\alpha=.70$, authority $\alpha=.73$, harm $\alpha=.72$, and fairness $\alpha=.72$. Participants also completed demographics.

Results and discussion

Consistent with Studies 1 and 2, CRT scores correlated negatively with both theism and binding foundation endorsement (particularly authority and loyalty), although this time the correlations between CRT and conservatism, and between CRT and sanctity, did not reach significance (see Table 3). Again, a mediation model predicting theism ($n=181$) revealed that CRT performance negatively predicted endorsement of the binding, $B=-.21$, $SE=.07$, $p=.006$, but not individualizing foundations, $B=-.08$, $SE=.08$, $p=.269$ (see Figure 3a). In turn, binding foundation endorsement predicted greater theism, $B=.51$, $SE=.07$, $p<.001$, whereas individualizing foundation endorsement did not, $B=-.10$, $SE=.07$, $p=.173$. Once again, there was a significant indirect effect of CRT performance through binding, $B=-.11$, $SE=.05$, $CI_{95\%}[-.216, -.024]$, but not individualizing foundation endorsement, $B=.01$, $SE=.01$, $CI_{95\%}[-.006, .046]$, and these two indirect effects were significantly different from one another, $Diff_B=-.11$, $SE=.05$, $CI_{95\%}[-.230, -.025]$. The direct effect also dropped below significance, $B=-.08$, $SE=.07$, $p=.227$. Results differed slightly when age and gender were included as controls ($n=177$): individualizing foundation endorsement negatively predicted theism, $B=-.16$, $SE=.08$, $p=.044$, and the indirect effect of CRT performance via binding foundation endorsement was no longer significant, $B=-.09$, $SE=.05$, $CI_{95\%}[-.199, .002]$.

Again, a mediation model predicting conservatism ($n=182$) revealed that CRT performance again negatively predicted endorsement of the binding foundations, $B=-.23$, $SE=.08$, $p=.002$ but not the individualizing foundations, $B=-.05$, $SE=.08$, $p=.506$ (see Figure 3b). In turn,

binding foundation endorsement predicted increased conservatism, $B=.58$, $SE=.07$, $p<.001$, and individualizing foundation endorsement predicted reduced conservatism, $B=-.25$, $SE=.07$, $p<.001$. Consistent with Studies 1 and 2, there was a significant indirect effect of CRT performance through endorsement of the binding, $B=-.13$, $SE=.05$, $CI_{95\%}[-.237, -.042]$, but not individualizing foundations, $B=.01$, $SE=.02$, $CI_{95\%}[-.030, .070]$, and these indirect effects were significantly different from one another, $Diff_B=-.15$, $SE=.06$, $CI_{95\%}[-.283, -.032]$. This analysis also revealed a significant direct effect between CRT performance and increased conservatism when accounting for moral foundation endorsement, $B=.14$, $SE=.07$, $p=.038$, but this was the only study to demonstrate this finding. Results were similar when controlling for age and gender ($n=177$), except the indirect effect via binding foundation endorsement no longer reached significance, $B=-.09$, $SE=.05$, $CI_{95\%}[-.205, .000]$.

Thus, the results of Study 3 further corroborate the importance of the binding foundations for mediating the impact of reduced analytic thinking on religiosity and conservatism, and generalized these effects to a student sample. Yet, we recognize religiosity and conservatism are not monolithic; these effects may be driven by a particular facet of these constructs. To examine these possibilities, we turned to an open dataset (Pennycook et al., 2014b).

Table 3

Means, Standard Deviations, and Correlations between Key Variables in Study 3

Variables	1	2	3	4	5	6	7	8	9	10	11	12
Mean	3.94	3.75	4.03	4.03	4.42	4.45	4.39	0.55	4.22	80.22	19.13	.39
SD	0.70	0.95	0.69	0.80	0.56	0.67	0.61	0.86	1.44	32.46	1.36	-
1. Binding		.87***	.85***	.86***	.38***	.41***	.25***	-.23**	.45***	.48***	-.19*	.10
2. Sanctity			.59***	.57***	.26***	.33***	.12	-.12	.47***	.52***	-.13	-.16*
3. Authority				.66***	.32***	.33***	.25***	-.31***	.30***	.32***	-.26***	.16*
4. Loyalty					.41***	.39***	.32***	-.18*	.37***	.36***	-.11	.05
5. Individualizing						.89***	.87***	-.05	-.04	.11	.11	-.24**
6. Harm							.55***	-.11	.03	.18*	.02	-.25***
7. Fairness								.01	-.12	.00	.14	-.18*
8. CRT									.02	-.18*	.30***	.40***
9. Conservatism										.30***	-.15*	.06
10. Theism											-.11	-.13
11. Age												.27***
12. Gender (0=w, 1=m)												

Note: *= $p < .05$, **= $p < .01$, ***= $p < .001$.

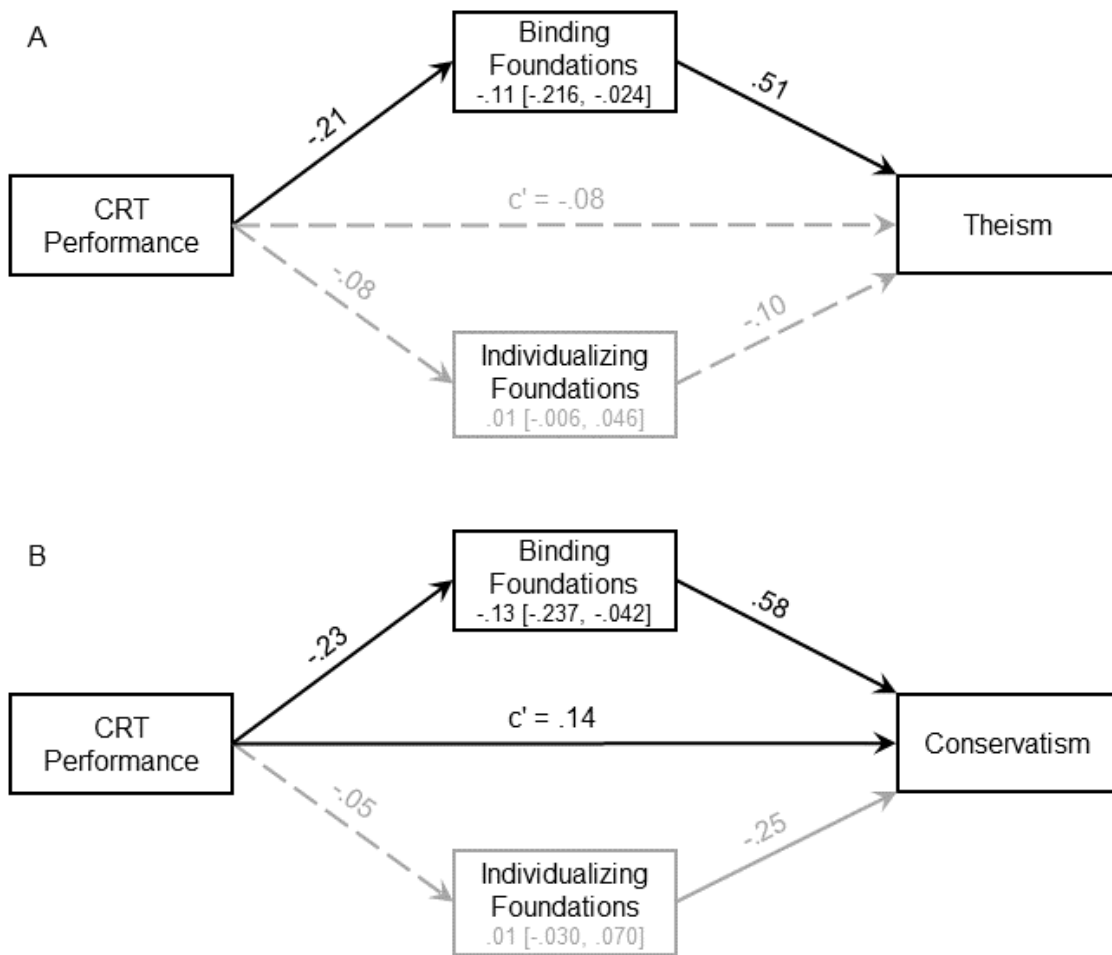


Figure 3. In Study 3, endorsement of the binding, but not individualizing, moral foundations mediated the relationships between Cognitive Reflection Test performance and theism (Panel A) and political conservatism (Panel B). All regression coefficients are fully standardized. Solid lines indicate significant paths in the model; dashed lines indicate nonsignificant paths. Significant indirect effects are in black, nonsignificant indirect effects are in grey.

Study 4

In Study 4, we examined whether the indirect effects identified in Studies 1-3 would replicate in a larger, previously-published dataset, which also afforded the opportunity to examine whether these patterns would emerge for measures of both religious belief and participation. Religious belief refers to endorsement of religious concepts (e.g., belief in the soul), whereas religious participation refers to engaging in religious activity (e.g., attending services, Pennycook, Cheyne, Seli, Koehler, & Fugelsang, 2012). The measures of theism employed in Studies 1 and 3 assess belief in God, and thus qualify as an instance of religious belief. Hence, we anticipated the patterns obtained would hold for the (broader) measure of religious belief employed in this study. Moreover, past work suggests a similar impact of CRT performance on religious participation (Pennycook et al., 2014b; Saribay & Yilmaz, 2017). Hence, we anticipated that binding endorsement would mediate the effect of CRT on both religious belief and participation.

This dataset also afforded the opportunity to examine whether these patterns would emerge for measures of both social and fiscal conservatism (Pennycook et al., 2014b). Social conservatism centers on moral issues in society (e.g., euthanasia), whereas economic or fiscal conservatism focuses primarily on economic policy (e.g., tax breaks, e.g., Saribay & Yilmaz, 2017). Past work suggests that the link between CRT performance and conservatism primarily reflects social, rather than fiscal, conservatism (Pennycook et al., 2014b; Saribay & Yilmaz, 2017), and social conservatism aligns with religiosity more than does fiscal conservatism (e.g., Deppe et al., 2015). Hence, we anticipated that the indirect effects of CRT on conservatism observed in Studies 1-3 would emerge exclusively for social rather than fiscal conservatism.

Method

We downloaded the data presented by Pennycook and colleagues (2014b), comprised of 505 American MTurk workers (241 females; $M_{age}=30.96$, $SD=11.42$), from the Open Science Framework. Among other measures, participants completed the Cognitive Reflection Test (65.3% scored 0, 22.4% scored 1, 7.1% scored 2, and 5.1% scored 3), a 9-item measure of religious belief (Pennycook et al., 2012), a 6-item measure of religious participation, and single-item measures of social and fiscal conservatism. Notably, the measure of religious belief focused on beliefs other than theism, assessing, for example, participants' beliefs in the efficacy of prayer, existence of the soul, and existence of an afterlife. Pennycook and colleagues also assessed moral foundations via endorsement of six individualizing principles (e.g., supporting the autonomy of others, being fair) and four binding principles (e.g., being patriotic and loyal; showing respect for legitimate authority) in terms of importance for their moral thinking (1=*irrelevant*, 7=*extremely important*). For full details regarding sample and measures, see Pennycook and colleagues (2014b).

To model the indirect effects of CRT performance simultaneously on social and fiscal conservatism, and simultaneously on religious beliefs and participation, we computed two path models in Mplus 8 (Muthén & Muthén, 1998-2017). Researchers commonly employ path analysis as an extension of multiple regression for simultaneously modeling multiple outcome variables (Darlington & Hayes, 2017). We modeled CRT performance as the exogenous variable, binding and individualizing foundation endorsement as intermediate variables (allowed to correlate), and the two subcategories as intercorrelated outcome variables (see Figure 4). We defined all the paths in these models, so the models are saturated, which precludes the generation of global model fit statistics (Kline, 2016). However, our theoretical focus centers on the indirect effects of CRT performance, rather than overall model fit, so we evaluated the indirect effects in

terms of path coefficients and accompanying standard errors, similar to the regression-based models in Studies 1-3 (Hoyle, 2012). For consistency with Studies 1-3, we standardized all path coefficients and present bias-corrected confidence intervals based on 10,000-sample bootstrapping.

Results and Discussion

Consistent with Studies 1-3, CRT performance correlated negatively with overall endorsement of the binding, but not individualizing, foundations (see Table 4). Moreover, CRT performance correlated negatively with social—but not fiscal—conservatism, as well as religious belief—but not participation (see also Pennycook et al., 2014b).

To test whether the theism effects in Studies 1 and 3 would replicate, we began by modelling ($n=505$) religious belief and participation (see Figure 4a). As before, CRT performance negatively predicted endorsement of the binding, $B=-.22$, $SE=.04$, $p<.001$, but not individualizing foundations, $B=-.01$, $SE=.05$, $p=.763$. In turn, binding foundation endorsement predicted both increased religious belief, $B=.54$, $SE=.04$, $p<.001$, and participation, $B=.51$, $SE=.04$, $p<.001$. Conversely, individualizing foundation endorsement did not predict either religious belief, $B=-.05$, $SE=.04$, $p=.196$, or participation, $B=-.04$, $SE=.04$, $p=.342$. Consistent with Studies 1 and 3, endorsement of the binding foundations carried significant variance from CRT performance to both religious belief, $B=-.12$, $SE=.02$, $CI_{95\%}[-.168, -.072]$, and participation, $B=-.11$, $SE=.02$, $CI_{95\%}[-.159, -.067]$. Conversely, endorsement of the individualizing foundations did not carry significant variance to either religious belief, $B<.01$, $SE<.01$, $CI_{95\%}[-.003, .010]$, or participation, $B<.01$, $SE<.01$, $CI_{95\%}[-.003, .009]$.

The direct effect of lower CRT performance remained significant on religious belief, $B=-.11$, $SE=.04$, $p=.004$, but not participation, $B=.06$, $SE=.04$, $p=.133$. To be analytically consistent

with our models in Studies 1-3, we controlled for age and gender's relationships with the outcomes but not the intermediate variables, and results were similar ($n=498$). Finally, model constraint tests verified that the indirect effect through the binding foundations was larger than through individualizing foundations for both religious belief, $Z_{diff}=-4.77$, $p<.001$, and participation, $Z_{diff}=-4.63$, $p<.001$. Moreover, the difference in the indirect effects on religious belief than for religious participation was not significant, $Z_{diff}=-0.98$, $p=.329$. This finding indicates that, consistent with expectations, the indirect effect observed in Studies 1 and 3 generalizes to both religious belief and participation.

Next, to test whether the conservatism effects in Studies 1-3 would replicate, we modelled ($n=503$) social and fiscal conservatism (see Figure 4b). CRT performance again negatively predicted endorsement of the binding, $B=-.22$, $SE=.04$, $p<.001$, but not individualizing foundations, $B=-.02$, $SE=.05$, $p=.714$. In turn, binding foundation endorsement predicted both increased social, $B=.49$, $SE=.04$, $p<.001$, and fiscal conservatism, $B=.24$, $SE=.05$, $p<.001$. Additionally, individualizing foundation endorsement predicted both decreased social, $B=-.27$, $SE=.04$, $p<.001$, and fiscal conservatism, $B=-.17$, $SE=.05$, $p<.001$. Moreover, consistent with Studies 1-3, endorsement of the binding foundations carried significant variance from CRT performance to both social, $B=-.11$, $SE=.02$, $CI_{95\%}[-.154, -.066]$, and fiscal conservatism, $B=-.05$, $SE=.02$, $CI_{95\%}[-.086, -.027]$, whereas endorsement of the individualizing foundations did not significantly mediate effects for either social, $B<.01$, $SE=.01$, $CI_{95\%}[-.019, .029]$, or fiscal conservatism, $B<.01$, $SE=.01$, $CI_{95\%}[-.012, .020]$.

The direct effect of reduced CRT performance was not significant for either social, $B=-.01$, $SE=.04$, $p=.784$, or fiscal conservatism, $B=.03$, $SE=.05$, $p=.490$. Results did not differ when controlling for the relationships between age and gender and the outcome variables ($n=496$).

Finally, model constraint tests verified that the indirect effect of CRT performance through the binding foundations was larger than through the individualizing foundations for both social, $Z_{\text{diff}}=-4.03, p<.001$, and fiscal conservatism, $Z_{\text{diff}}=-3.02, p=.002$. Moreover, the difference between the indirect effects on social versus fiscal conservatism was significant, $Z_{\text{diff}}=-3.92, p<.001$. Hence, the endorsement of the binding foundations mediated the impact of CRT performance on both social and fiscal conservatism, but this relationship was stronger for social than for fiscal conservatism.

Thus, reanalysis of a previously-published dataset (Pennycook et al., 2014b) corroborated and clarified Studies 1-3. It confirmed importance of the binding but not individualizing foundations for understanding the relationship between reduced analytic thinking, religiosity, and conservatism. The indirect effects on theism generalized to both religious belief and participation, whereas the indirect effects on conservatism emerged more strongly, though not exclusively, for social rather than fiscal conservatism.

Table 4

Means, Standard Deviations, and Correlations between Key Variables in Study 4

Variables	1	2	3	4	5	6	7	8	9
Mean	12.78	28.06	1.53	2.17	2.81	41.08	18.62	30.96	.52
SD	4.19	4.57	1.18	1.12	1.18	33.90	23.83	11.42	-
1. Binding		.21***	-.22***	.43***	.19***	.56***	.48***	.11*	-.10*
2. Individualizing			-.01	-.17***	-.12**	.07	.07	.01	-.12**
3. CRT				-.09*	-.01	-.23***	-.05	.03	.21***
4. Social Conservatism					.57***	.48***	.47***	.17***	.11
5. Fiscal Conservatism						.25***	.24***	.10*	.13**
6. Religious Belief							.68***	.33***	-.25***
7. Religious Participation								.20***	-.07
8. Age									-.15**
9. Gender (0=w, 1=m)									

Note: *= $p < .05$, **= $p < .01$, ***= $p < .001$.

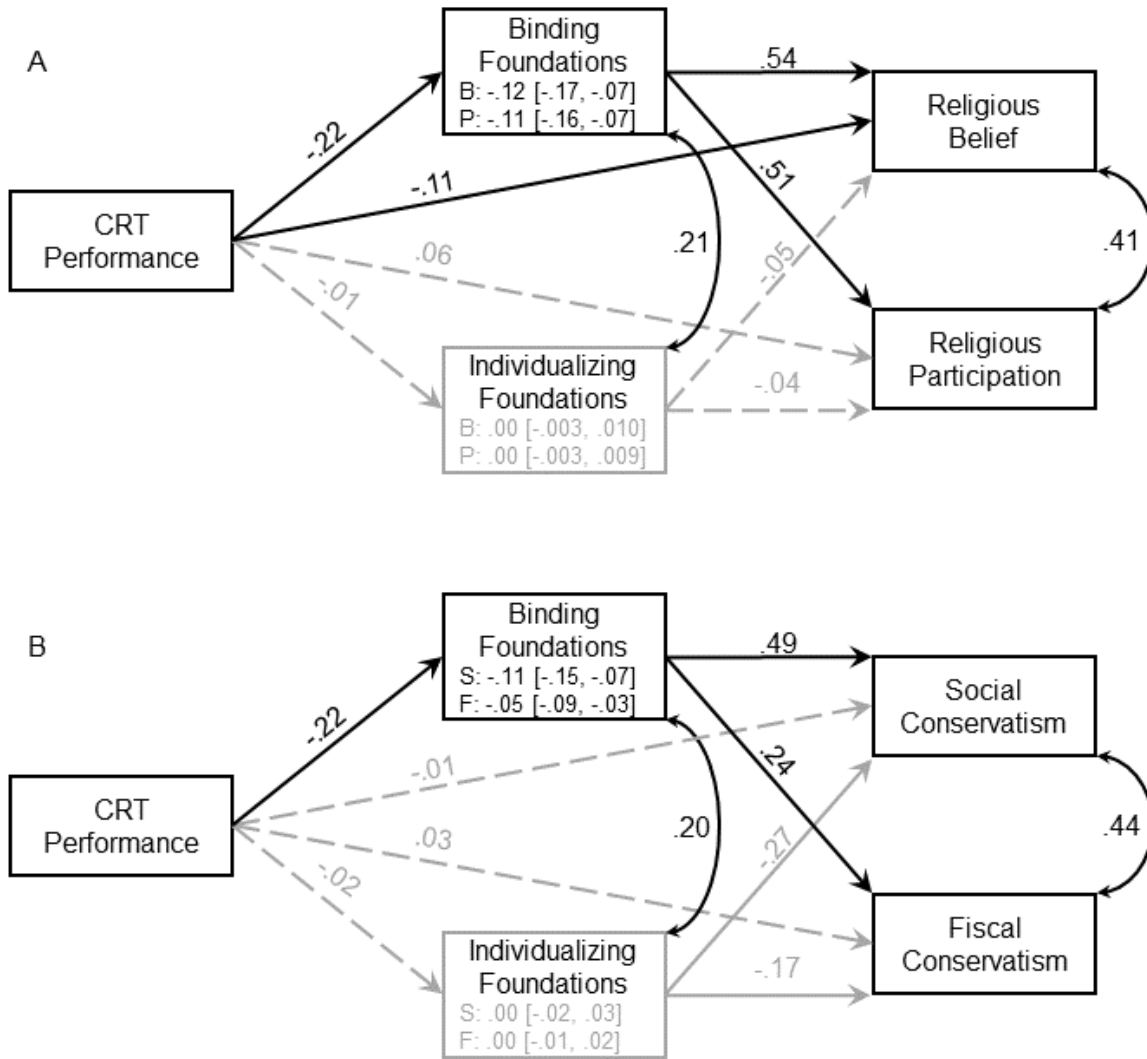


Figure 4. In Study 4, endorsement of the binding, but not individualizing, moral foundations mediated the relationships between Cognitive Reflection Test performance and both religious belief and participation (Panel A) and both social and fiscal conservatism (Panel B). All coefficients are fully standardized. Solid lines indicate significant paths in the model; dashed lines indicate nonsignificant paths. Significant indirect effects are in black, nonsignificant indirect effects are in grey.

General Discussion

Across three new studies and a reanalysis of published data, we found evidence consistent with the idea that endorsement of the binding—but not individualizing—moral foundations accounts for a portion of the relationships between analytical cognitive style and both religiosity and political conservatism. In Study 1, binding foundation endorsement mediated the effect of CRT performance on theism, intrinsic religiosity, and conservatism; Study 2 replicated this pattern for conservatism using a different moral foundation measure (this study did not assess religiosity); Study 3 replicated these patterns for both theism and conservatism in a student sample. Finally, in Study 4, we reanalyzed data from Pennycook and colleagues (2014b) and confirmed a similar pattern of indirect effects: The impact of CRT performance via the binding but not individualizing foundations emerged for measures of both religious belief and participation, and for both social and fiscal conservatism, although effects were stronger for social than fiscal conservatism.

Our findings thus may suggest people less prone to reflect are higher in both theism and political conservatism partly because such people more strongly endorse moral values that promote group cohesion (i.e., the binding foundations), and thus identify more strongly with moral communities promoting such values. Conversely, the degree to which people endorse the individualizing foundations—focused on individual rights and wellbeing—does not appear to explain significant variance between analytic cognitive style and either religiosity or conservatism.

Notably, this pattern of findings held across three different measures of moral foundation endorsement (moral foundations questionnaire, the moral foundations sacredness scale, and explicit endorsement of foundation principles), four different measures of religiosity (theism,

intrinsic religiosity, and measures of both religious belief and participation), and measures of overall conservatism as well as both social and fiscal conservatism. Moreover, these findings emerged in both online (Studies 1, 2, and 4) and student samples (Study 3), and across samples collected both by us and by others.

Implications

These findings align with a host of other research demonstrating people who are more religious and politically conservative often score lower on measures of analytic cognitive style than their less religious and more liberal counterparts (e.g., Bahçekapili & Yilmaz, 2017; Deppe et al., 2015; Pennycook & Rand, 2019; Pennycook et al., 2014a, 2014b, 2016; Yilmaz & Saribay, 2016, 2017b). Previous research has examined various mechanisms contributing to this effect, including detecting conflicting beliefs (Pennycook et al., 2014a), engaging in deep processing (Eidelman et al., 2012), and motivated processing (Jost, et al., 2003). The current work suggests the operation of an additional (nonexclusive) mechanism shared between religiosity and conservatism: endorsement of the binding moral foundations. This pattern suggests people scoring lower in analytic cognitive style tend to endorse the moral importance of values related to sanctity, respect for authority, and ingroup loyalty—values that bind people into tight social communities (Haidt, 2012; Morgan et al., 2018). In turn, people who hold these values are more likely to identify as religious and conservative, two related ideologies that actively promote such values (Graham & Haidt, 2010; Haidt & Graham, 2007). Hence, endorsement of the binding foundations may explain some of the impact of analytic cognitive style on identification with religion and on conservative political orientation.

Conversely, differences in endorsement of the individualizing foundations of harm and fairness do not likely explain much variance in the link between analytic cognitive style and

either religiosity or conservatism. These foundations reflect moral concern for individual well-being (e.g., freedom from distress or disadvantage) rather than group cohesion, and previous research suggests liberals tend to score higher than conservatives on such measures, though conservatives do endorse these foundations a fair amount (e.g., Graham et al., 2009). In the current work, we found small and inconsistent correlations between endorsement of the individualizing foundations and both religiosity and conservatism, and systematic differences in individualizing endorsement did not carry significant variance between CRT performance and either religiosity or conservatism in any study. Hence, endorsement of individualizing foundations did not help explain the link between ACS, religiosity, and conservatism in the present studies; only binding endorsement carried significant indirect effects.

These findings resonate with theoretical work suggesting lower analytic cognitive style may be useful in socially dense environments where group cohesion is paramount (Morgan et al., 2018). Recall that social density refers to the network of social connections between people, i.e., community cohesion, rather than population density. Thus, small towns where ‘everyone knows each other’ have high social density even though they may have low population density. In socially dense environments, people can anticipate frequent, stable, and temporally extended social contact with relatively few individuals who know one another (and hence may gossip and share information), as compared to less socially dense environments where people can anticipate social contact that is less frequent, more labile, of less certain duration, with a wider array of social partners, where reputational concerns may be less paramount.

Hence, socially dense environments tend to foster a robust sense of group identification and shared values. Under these conditions, it may be advantageous to minimize critical reflection that may potentially undermine the communal values shared by the cohesive group (e.g.,

questioning theism). Conversely, less socially dense environments (e.g., large urban areas) demanding more superficial contact with a wider array of partners may foster increased cognitive analytic style to deal with the constantly revolving door of social partners (see also Rand, 2016). Hence, compared to less social dense environments, socially dense environments may promote reduced ACS, increased religiosity and conservatism, and an increased focus on the elements of morality that bind people into tight social groups (the binding foundations). The current findings suggest binding endorsement may explain some of the variance shared between these constructs.

However, the cross-sectional nature of this study means that results do not rule out consistent with alternative frameworks. Here we investigated models where analytic cognitive style predicts binding foundation endorsement, which predicts religious belief and conservative political identification in turn. Nevertheless, this chain of proposed effects is by no means the only plausible order of effects among these variables. For example, religions often teach, endorse, and socialize moral values that map onto the binding foundations (e.g., Haidt, 2012). Likewise, conservative ideology often emphasizes concerns related to the binding of social groups (e.g., Lakoff, 2010). These arguments would suggest our models could be completely reversed, with religiosity predicting increased binding foundation endorsement, and, in turn, decreased analytical cognitive style. Similarly, some have argued that moral foundation endorsement is a downstream consequence of political ideology, rather than an attitudinal substrate for such ideology (e.g., Federico, Ekstrom, Reifen Tagar, & Williams, 2016; Smith, Alford, Hibbing, Martin, & Hatemi, 2017). Indeed, there are likely reciprocal effects among analytic cognitive style, beliefs about the nature of the moral domain, and identification with political and religious communities (cf. Morgan et al., 2018).

Moreover, mediation analyses of cross-sectional data cannot establish the reality of a

particular causal sequence (e.g., Fiedler, Schott, & Meiser, 2011; Fiedler, Harris, & Schott, 2018); nor can they adjudicate between alternate sequences of variables (e.g., Lemmer & Gollwitzer, 2017). Therefore, reversing the order of variables in our models may not be informative. Instead, mediation models can be informative when researchers begin with a theoretical stance and examine whether the data accord with theory. If the theory is correct, then the patterns predicted by the theory should be present in the data; if not, the theory is unlikely to be correct (Hayes, 2013; Tryon, 2018). Hence, the current findings suggest endorsement of the binding but not individualizing foundations may link ACS to religiosity and conservatism, but they cannot rule out other possible theoretical models. To distinguish between various causal models would require longitudinal work exploring how analytic cognitive style contributes to the development of moral beliefs and identification with moral communities over time, and how identification with moral communities subsequently enhances particular moral values or decreases reflexive reflection. Future research should consider such designs.

Limitations

Although these findings are informative, like all research, they suffer from some limitations. In the previous section, we discuss above the issues inherent to cross-sectional designs and mediation analyses, so we do not reiterate that limitation here. Additionally, most religious participants identified as Christian. It remains to be seen how well these findings replicate for people who endorse other religious traditions. Some theorists argue religious traditions centered on ‘Big Gods’ (powerful moralizing deities) facilitated the increase in social density over the course of human history (e.g., Norenzayan, 2013; Laurin, 2017). Accordingly, it is possible that the current findings will emerge more clearly when assessing adherents of religions involving ‘Big Gods,’ such as Christianity and Islam, more than groups that do not

adhere to this perspective, such as Buddhism or animism. Likewise, most participants hailed from North American backgrounds. Hence, it remains to be seen how well the current findings generalize to populations where endorsement of concerns related to the binding foundations tend to be higher than in North American samples, such as India or Brazil (e.g., Haidt, Koller, & Dias, 1993; Jensen, 1998). The ubiquity of binding concerns in such populations may weaken the links among ACS, religiosity, and conservatism, or may throw these relationships into starker relief. Future work may profitably investigate these possibilities.

Conclusion

In sum, the current work clarifies that endorsement of the binding but not individualizing foundations accounts for some of the relationship between analytic cognitive style and both religiosity and political orientation. Hence, binding endorsement may reflect a common psychological substrate explaining why people who reflect less tend to identify more strongly with religion and conservatism, though much work exploring the causal interplay of these variables remains to be done.

Author Contributions: [1], [2], and [4] were responsible for the majority of manuscript development. [2] and [3] collected the data.

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