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# Specifying the role of religion in entrepreneurial action: a cognitive perspective

Saulo Dubard Barbosa · Brett R. Smith

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**Abstract** Research on the relationship between religion and entrepreneurship has produced mixed findings. We argue such equivocal findings are partly the result of under-specification of the role of religion in entrepreneurial action. To address this issue, we build on the process perspective of entrepreneurial cognition by *simultaneously* incorporating mental representations *and* cognitive resources. Specifically, we theorize a cognitive process that incorporates both framing effects of opportunity cues and religious belief integration based on *sanctification* into the assessment of feasibility and desirability of entrepreneurial action. Through two within-subject experiments, we find (i) positively framed opportunity cues yield more favorable assessments of entrepreneurial action than negatively framed opportunity cues, and (ii) religious belief integration moderates the relationship between framing and assessments of entrepreneurial action, enhancing perceived feasibility and desirability when information framing is negative. We discuss the implications of our model to research

the theological turn of entrepreneurship and a cognitive perspective of entrepreneurial action.

**Plain English Summary** Based on two within-subject experiments, our findings suggest that entrepreneurs who integrate their religious beliefs into their ventures tend to evaluate opportunities more positively, even in the face of negatively framed opportunity cues. Indeed, positively framed opportunity cues yield more favorable assessments than negatively framed cues, but religious belief integration moderates the relationship between framing and opportunity evaluation, enhancing perceived feasibility and desirability when framing is negative. This suggests that deep anchoring religious beliefs might help to foster optimism and cope with uncertainty, which can be beneficial in daunting times. However, it also suggests that religious beliefs are ineffective in debiasing overconfidence—They might even contribute to it. Our study expands research at the intersection of religion and entrepreneurship by specifying how and why religion matters in entrepreneurial action. We specify the role of religion and extend research in the cognitive perspective of entrepreneurial action through a process orientation.

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## 1 Introduction

There is a resurgence of interest in the role of religion in entrepreneurial research (e.g., Dana, 2010; Gümüşay, 2020; Block et al., 2020; Ganzin et al., 2020; Smith et al., 2021a, 2021b; Smith et al., 2023a, 2023b). This renewed focus builds on seminal research dating back to the Protestant work ethic (Weber, 1930/1958) and recognizes the power of religion as an important explanatory variable for entrepreneurial action (Dana, 2010). Despite this traction, extant research remains equivocal about the influence of religion in entrepreneurial action, with studies finding a facilitating, hindering, or non-existent role (e.g., Minns & Rizov, 2005; Audretsch et al., 2013; Balog et al., 2014). This equivocality is due at least partly to theoretical and empirical under-specification of the role of religion in entrepreneurship (e.g., Gümüşay, 2020).

The cognitive perspective of entrepreneurship has generated a substantial body of research over the last few decades (e.g., Busenitz & Barney, 1997; Mitchell et al., 2002, 2007). This research has contributed much to our understanding of entrepreneurial action, decision-making, and opportunity evaluation (e.g., Cornelissen & Clarke, 2010; McMullen & Shepherd, 2006; Shepherd et al., 2015). However, extant research on entrepreneurial cognition fails to fully deliver on its potential because it also suffers from theoretical under-specification. One of the major gaps in the literature is the limited articulation of a process perspective of entrepreneurial cognition, which recognizes the role of both mental representations and cognitive resources (Grégoire et al., 2011) and provides a more complete understanding of how deep anchoring beliefs and deep cognitive structures affect entrepreneurial action (Krueger, 2007; Krueger & Day, 2010).

To address these issues, we build on the process perspective of entrepreneurial cognition to propose a cognitive model that *simultaneously* incorporates both mental representations *and* cognitive resources anchored in deep cognitive structures based on religion. Indeed, religion is likely to affect deep cognitive structures, offering cognitive resources that shape

individuals' mental models of what it means to be an entrepreneur and what an entrepreneurial opportunity looks like. Deeply anchored religious beliefs might affect how entrepreneurs “connect the dots” and interpret cues to both identify and evaluate opportunities (Baron, 2006; Baron & Ensley, 2006). Thus, we propose and test a cognitive model that incorporates both framing effects of opportunity cues and religious belief integration into the assessment of feasibility and desirability of entrepreneurial action.

In so doing, we make two contributions. First, we contribute to research on the theological turn in entrepreneurship by specifying how and why religion matters in entrepreneurial action (Smith et al., 2021a, 2021b). Based on *sanctification*, we find religious belief integration is an important moderator of framing effects on perceived feasibility and desirability of entrepreneurial action. Our study answers the call for more complete theorizing about the role of religion (Balog et al., 2014) and the inclusion of religion as a moderator in entrepreneurship (Block et al., 2020) to reconcile previously mixed findings. Second, we contribute to research on entrepreneurial cognition by testing a process perspective. As such, we take an important step to “unpacking” the black box of cognitive processes of entrepreneurship through the inclusion of both mental representations and cognitive resources (Grégoire et al., 2011). In so doing, we shed light on how deep anchoring beliefs— Influenced by religion—shape perceptions of feasibility and desirability of an opportunity, thus extending research on how deep cognitive structures affect opportunity recognition and evaluation (Baron, 2006; Baron & Ensley, 2006; Krueger, 2000, 2007) and complementing research on entrepreneurial action that focuses on perceived feasibility and desirability as independent variables of action by examining these perceptions as dependent variables of the cognitive process (e.g., Mitchell & Shepherd, 2010).

## 2 Theoretical background

The theory of entrepreneurial action proposed two stages (McMullen & Shepherd, 2006; Mitchell & Shepherd, 2010): opportunity attention (why entrepreneurs recognize and act on opportunities in general) and opportunity evaluation (why entrepreneurs recognize and act on opportunities specifically). We

focus on the second stage of opportunity evaluation, where entrepreneurs recognize and act on opportunities in the midst of uncertainty. While opportunity evaluation is affected by many variables, we build from and extend a cognitive perspective of entrepreneurial action to posit that action is based on entrepreneurs' mental representations of information (framing), which are in turn affected by their cognitive resources and deep anchoring beliefs (religious belief integration).

## 2.1 Information framing and opportunity evaluation

Extant literature portrays entrepreneurs as being more optimistic on average than non-entrepreneurs (e.g., Busenitz & Barney, 1997; Cassar, 2010; Cooper et al., 1988). For instance, Palich and Bagby (1995) showed that entrepreneurs tend to categorize equivocal business scenarios significantly more positively than other subjects. However, research exploring perceptual differences in terms of opportunity evaluation and decision-making between entrepreneurs is still in its early stages (Shepherd et al., 2015). One explanatory factor for such differences is certainly the type and quality of the information each entrepreneur has, receives, and gathers about the opportunity (Grégoire et al., 2010; Norton & Moore, 2002).

Research on cognitive psychology and decision-making has long acknowledged the role of information availability and framing (e.g., Hogarth, 1987; Payne & Bettman, 2004; Tversky & Kahneman, 1974). This research has consistently shown that information framing (i.e., the way a problem or task is formulated) impacts individuals' perceptions and choices even when they are presented with logically equivalent choice situations (Kuhberger, 1998; Levin et al., 1998; Tversky & Kahneman, 1981). For instance, McNeil et al. (1982) showed that preferences for alternative cancer therapies differed when the problem was framed in terms of the probability of living rather than in terms of the probability of dying. We suggest that a similar phenomenon might happen when entrepreneurs evaluate business opportunities.

Consistent with previous research on mental models and opportunity recognition (e.g., Baron & Ensley, 2006; Grégoire et al., 2010; Mitchell et al., 2002), we suggest that entrepreneurs form mental representations of an opportunity based on the information they have and the cues they gather from the environment.

In addition, we suggest that such mental representations might be biased by information framing. Specifically, the very description of an opportunity might make certain outcomes more salient than others (e.g., success vs. failure). Consistent with framing studies on outcome salience (Kuhberger, 1998), we hypothesize that positive framing of the likelihood of success of a new venture opportunity will yield more favorable judgments than negative framing of the likelihood of failure in terms of higher levels of perceived feasibility and desirability.

**Hypothesis 1:** Positive framing about a new venture opportunity will generate higher levels of (a) perceived feasibility and (b) perceived desirability than negative framing.

## 2.2 When and how does religious belief integration affect entrepreneurial action?

Having specified the role of information framing in the mental representations that entrepreneurs form about opportunities, we now turn our attention to the role of cognitive resources and deep anchoring beliefs to complete our model of opportunity evaluation and shed light on how religion affects this process. We specifically focus on religious belief integration, as it reflects deep anchoring beliefs that lie beneath cognitive structures, attitudes, intentions, and perceptions, likely affecting how entrepreneurs think and act on opportunities (Krueger, 2007; Krueger & Day, 2010).

Following extant literature, we define religious belief integration in terms of entrepreneurs' perceptions of how and to what degree their religious beliefs and practices are integrated with the businesses they operate (Lynn et al., 2009).<sup>1</sup> When an entrepreneur integrates religious beliefs within the business she operates, this is a strong indicator that such beliefs are deeply anchored in the entrepreneur's cognitive structure and likely shape the entrepreneur's attitudes, intentions, perceptions, and actions (Krueger, 2007). Religious belief integration thus serves as a cognitive resource to encourage or restrain entrepreneurs from acting on entrepreneurial opportunities (e.g., Dana,

<sup>1</sup> We show the specific items used to assess religious belief integration in Appendix 1.

2010). As entrepreneurs evaluate opportunities, they are more likely to find opportunities attractive when they can integrate their religious beliefs (Smith et al., 2019). This occurs through *sanctification*, a faith-based cognitive appraisal that imbues any aspect of life with divine character or significance (Mahoney et al., 1999).

A meta-analysis shows that sanctified objects take on increased importance and are related to a greater investment of time and energy (Mahoney et al., 2021). This is because individuals cognitively link secular endeavors, such as marriage or exercise, to religious endeavors to take on a sacred quality (Snyder et al., 2002). As such, individuals draw on a unique source of inspiration and resilience, as well as increased motivation to pursue and persevere in sanctified pursuits, especially during times of great difficulty and uncertainty (Mahoney et al., 1999). In this way, the sacred represents a powerful resource that individuals can tap into during difficult endeavors (Pargament & Mahoney, 2005).

Through sanctification, religious belief integration influences “not only the goals individuals establish, but also their cognitive sense of agency about achieving the goals. That is, religion instills confidence in believers that they can accomplish their goals” (Miller-Perrin & Mancuso, 2014: 113). This is consistent with management studies that find religious integration tends to make people more optimistic about their economic future, seeing “the glass half full” (Furnham, 1997). Neural studies further corroborate these relationships, showing the positive effects of religious practices on the ability of individuals to cope with challenges, anxiety, and stress (e.g., Inzlicht et al., 2009; Newberg & Waldman, 2009).

Taken together, these previous findings suggest that religious belief integration might be particularly important when an entrepreneur faces challenging prospects. Through a process of sanctification, entrepreneurs who integrate their religious beliefs within their entrepreneurial activities are more likely to build the necessary confidence and optimism to face adversity. Specifically, we hypothesize an interaction effect where religious belief integration moderates the effects of information framing when entrepreneurs are faced with the salience of negatively framed outcomes. In other words, this cognitive resource of religious belief integration might help entrepreneurs to temper negative framing effects and form more

favorable assessments of an opportunity’s feasibility and desirability even when they are faced with negatively framed opportunity cues.

Hypothesis 2: Religious belief integration will moderate the relationship between framing and (a) perceived feasibility and (b) perceived desirability about the new venture opportunity, such that higher levels of religious belief integration will yield higher levels of (a) perceived feasibility and (b) perceived desirability when the new venture opportunity is negatively framed.

### 3 Method

#### 3.1 Participants

We conducted two experimental studies in order to test our hypotheses. First, we conducted a pilot study with a sample of 412 students (47% female) enrolled in entrepreneurship courses at five different American universities. The sample was relatively young ( $M=21.68$ ,  $SD=3.76$ ) and had limited entrepreneurial experience (10% had already started a business). This pilot study allowed for a first test of Hypothesis 1 and for improving our measures and experimental scenarios.

For our main study, we built on a larger research project in an entrepreneurial ecosystem in a Midwestern city in the USA. Invitations to participate in the study were sent via email from two entrepreneurial accelerators, an angel investor network, and a regional university to attendees of recent entrepreneurial events. Based on these email requests, 95 respondents provided useable data for a within-subject analysis. Out of these, sixty-eight respondents (72%) had started or were in the process of starting at least one business. Since our measure of religious belief integration specifically assesses the degree to which religious beliefs are integrated with one’s existing business, we focused our main analysis on this restricted sample of 68 business founders.

This sample was predominantly male (28% women) and diverse in age ( $M=40.62$ ,  $SD=14.52$ ). The majority had either a college (54%) or a professional degree (35%). About 53% of the new businesses involved were already generating revenues from sales, and 69% were already employing other

people. They varied considerably in terms of number of employees ( $M=12.03$ ,  $SD=36.00$ ), sector (a total of 32 different sectors were represented), and annual revenues from sales (although a majority of 69% reported annual sales below \$100,000, about 9% reported annual sales between \$500,000 and \$1,000,000, and 9% reported annual sales of more than \$5,000,000). In addition, 72% of the business founders in our sample were serial entrepreneurs, i.e., had already started more than one business in the past ( $M=3.22$ ,  $SD=3.63$ ). When asked about their most successful business, these serial entrepreneurs also displayed diversity both in terms of number of employees ( $M=61.64$ ,  $SD=190.25$ ) and annual revenues from sales (about 38% reported annual sales below \$100,000, whereas 18% reported annual sales of more than \$5,000,000).

### 3.2 Research instrument and design

Our experiment prompted subjects with four variations of a scenario in which they were invited by a friend to join a new start-up. In each scenario, respondents were encouraged to put themselves vividly into each situation. After an initial description of the opportunity, they were asked to report their initial levels of perceived feasibility and desirability of this new venture, as well as their initial decisions about whether or not they would join. They were then provided with more information about the opportunity and were asked to report their final levels of feasibility and desirability for the new venture and their final decisions.

To provide a common baseline for all scenarios, the initial scenario description reported that the friend estimated the new venture's probability of success as "being around 50%." The additional information was framed in terms of a conjunctive structure of critical events (Tversky & Kahneman, 1974). In two out of four scenarios, participants were provided with positively framed information in the form of high probabilities of success for critical events that seemed necessary for successfully launching the new venture. The additional information provided in these scenarios read as follows.

Now suppose you talk further with your friend and actually read the business plan. You realize that your friend is already developing a

prototype for a very innovative product. There is a 90% chance that this prototype will be successfully developed. Moreover, there is an 80% chance that the business will receive adequate funding in order to launch the new product. There is a probability of 85% that this new venture will have enough cash flow to stay in business during its first years, and finally, there is a probability of 80% that the firm will be the first one to arrive in the market, having an important first-mover advantage.

In the other two remaining scenarios, participants were provided with negatively framed information in the form of low probabilities of failure for the same critical events. The additional information provided in these scenarios read as follows.

Now suppose you talk further with your friend and actually read the business plan. You realize that your friend is already developing a prototype for a very innovative product. There is a 10% chance that this prototype will never be successfully developed. Moreover, there is a 20% chance that the business will not receive adequate funding in order to launch the new product. There is a probability of 15% that this new venture will not have enough cash flow to stay in business during its first years, and finally, there is a probability of 20% that the firm will arrive too late in the market, with the window of opportunity having already closed due to market changes.

Notice that all scenarios are logically equivalent because the probabilities provided were mirrored and aimed to foster confidence by either enhancing the salience of a positive outcome or reducing the salience of a negative outcome. Consistent with a framing effect, we hypothesize that this manipulation will impact perceived feasibility and desirability. Furthermore, we analyze whether religious belief integration makes a difference in the assessment of these different scenarios.

To minimize practice and carryover effects (Keppel, 1991; Pedhazur & Schmelkin, 1991), the order in which the scenarios were presented was randomized, and different screens with demographic questions and psychometric scales separated the introduction of one scenario from the next. In addition, participants could not go



backward to check their previous answers once they had validated each screen. This approach likely minimizes carryover effects from one scenario to the other, but it does not reduce carryover effects within each scenario (i.e., between the first and the second measures of feasibility and desirability). Thus, such a design provides a strong test of our hypotheses.

### 3.3 Measures

#### 3.3.1 Independent variables

In our main study, there are two independent variables: (i) information framing (positive vs. negative) and (ii) the entrepreneurs' religious belief integration, i.e., the degree to which they integrated their religious beliefs and practices with their businesses. The pilot study had only the former.

*Information framing* was effect coded as 1 = "positive" for scenarios presenting high probabilities of success for critical events and -1 = "negative" for scenarios presenting low probabilities of failure for the same critical events.

*Religious belief integration* was measured at the individual level, independent of the experimental scenarios, through an adapted version of the Faith at Work Scale (FWS). The FWS is a 15-item measure of workplace religion informed by Judaism and Christianity (Lynn et al., 2009). Compared to other measures of religiosity and spirituality, the FWS exhibits several advantages. First, it adds substance to the assessment of workplace spirituality by including the specific Christian belief system, its derived practices, and how both spiritual beliefs and practices relate to work (Lynn et al., 2009). Thus, it provides not only an assessment of the direction of beliefs and their strength but also an assessment of the degree to which specific Christian beliefs are integrated in the workplace and in the respondent's life at work (Lynn et al., 2009, 2010). Second, the 15-item scale arguably reflects five dimensions of work-faith integration (relationship, meaning, community, holiness, and giving), yet all of them load in a single factor,<sup>2</sup>

<sup>2</sup> Previous research by Lynn and colleagues (2009, 2010) has consistently shown a single-factor structure. We also found a single-factor solution with our data. Results of our factor analysis are shown in Appendix 3.

which facilitates analysis and interpretation. Finally, the FWS has been used and validated by previous studies across a broad range of ages, occupations, industries, and Christian denominational affiliations, showing good and consistent validity and reliability (e.g., Lynn et al., 2009, 2010). Interestingly, Lynn et al. (2010) found it was negatively associated with organizational size, suggesting that smaller organizations are better able to integrate religious belief and practice with work.

We have adapted the original scale, specifically replacing the word "work" with "business" in order to capture how and to what degree entrepreneurs' religious beliefs and practices integrate with their businesses. The adapted scale includes items such as "I sense God's presence in my business," "My faith helps me deal with difficult business relationships," and "I pursue excellence in my business because of my faith" (the full scale is shown in Appendix 1). The scale captured the degree to which entrepreneurs integrated religious beliefs and practices with their current businesses, *not* the hypothetical venture presented in the experimental scenarios. Respondents were asked to indicate the degree to which they agreed with each item using a scale: 1 = "never or infrequently" to 5 = "always or frequently." The 15 adapted items showed good reliability and internal consistency (Cronbach's  $\alpha = 0.98$ ) as well as a single-factor structure. Therefore, we use the average of the 15 items in our main analyses.<sup>3</sup>

#### 3.3.2 Dependent variables

*Perceived feasibility* was assessed by the question, "How feasible do you think this new venture is?" (answers ranged from 1 = "not feasible at all" to 9 = "very feasible"). *Perceived desirability* was

<sup>3</sup> The high Cronbach alpha (=0.98) is explained by both the relatively high number of items and the high interitem covariance (1.85 on average – see full correlation matrix in Appendix 2). Item analysis led us to the conclusion that the scale could be reduced to fewer items, without losing reliability. However, we refrained from doing so because (i) scale refinement is beyond the scope of this study, (ii) we believe there is merit in using previously developed and validated scales without much change, for it facilitates comparison with other studies and meta-analysis, and (iii) our results are robust to such scale refinement, i.e., they remain substantively the same even if we use shorter versions of the FWS.

**Table 1** Pilot study: Multilevel mixed-effects modeling

	Perceived feasibility	Perceived desirability
	(1)	(2)
<i>Control variables</i>	Yes	Yes
<i>Exogenous</i>		
Information framing	0.54*** (0.03)	0.67*** (0.03)
Log restricted likelihood	-2570.84	-2768.15
Wald $\chi^2$	576.20***	656.32***
Df	83	83
No. of observations	1648	1648
No. of groups/participants	412	412

All models are multilevel mixed-effects REML regressions that include random effects for participants. Fixed-effects parameters are reported with standard errors in parentheses

\* $p < 0.05$

\*\* $p < 0.01$

\*\*\* $p < 0.001$

assessed by the question, “How attractive is the option of joining your friend in this new venture?” (answers ranged from 1=“not attractive at all” to 9=“very attractive”). In our pilot study, these two variables were measured after the introduction of additional information in each scenario. In our main study, these two questions were systematically asked before and after the introduction of additional information in each scenario.

### 3.3.3 Control variables

We included six control variables in our main analyses: gender, age, entrepreneurial experience, current involvement in a start-up process, education level, and start-up knowledge. Previous research has shown that *gender* (e.g., Gupta et al., 2008) and *age* (e.g., Gielnik et al., 2012) influence perceptions of entrepreneurship, perceived entrepreneurial self-efficacy, intentions toward entrepreneurship, and likelihood of venture growth. In addition, *past* and *present experience* in starting a new business are likely to affect an individual’s cognition, including opportunity identification and evaluation (e.g., Baron, 1998; Raffiee & Jie, 2014). *Education level* might also affect opportunity judgment since it is a proxy for the entrepreneur’s human capital shown to influence entrepreneurial entry and the survival of small businesses (e.g., Unger et al., 2011). Therefore, we included objective measures of these control variables in our analyses.

We also included a subjective measure of *start-up knowledge* (a self-reported assessment ranging from 1=“not knowledgeable at all” to 5=“extremely knowledgeable”). This measure provides a proxy for specific human capital in the start-up context (Unger et al., 2011) and captures respondents’ perceived entrepreneurial self-efficacy (Zhao et al., 2005), which is likely to affect the assessment of entrepreneurial opportunities.

Our pilot study did not include this last measure of *start-up knowledge*. However, it included all other control variables, plus a dummy variable assessing whether at least one of the parents had entrepreneurial experience, a continuous variable for the number of years of employment experience, and a categorical variable for the major area of study.

## 4 Analyses and results

### 4.1 Results from the pilot study

The main purpose of the pilot study was to test our experimental scenarios at a large scale and thus provide a first test of Hypothesis 1.<sup>4</sup> Table 1 shows the results of multilevel mixed models for both perceived

<sup>4</sup> Given this purpose and to reduce paper length, we report descriptive statistics from the pilot study in Appendix 4.



feasibility and perceived desirability. Both models include all control variables and random effects estimated independently for each participant.<sup>5</sup> This approach allows for accurate decomposition of variance between and within subjects, providing reliable test statistics (Misangyi et al., 2006).<sup>6</sup>

Table 1 shows positive and statistically significant coefficients for the effect of information framing on both perceived feasibility ( $\beta=0.54$ ,  $p=0.000$ , 95% CI [0.49, 0.59]) and perceived desirability ( $\beta=0.67$ ,  $p=0.000$ , 95% CI [0.62, 0.73]). These fixed-effect coefficients have substantial effect sizes of  $f^2=0.34$  and  $f^2=0.41$  (Cohen, 1988; Selya et al., 2012).<sup>7</sup> This lends support to Hypothesis 1, suggesting that positive framing about a new venture opportunity generates higher levels of (a) perceived feasibility and (b) perceived desirability than negative framing.

## 4.2 Main analyses and results

Table 2 shows descriptive statistics and correlations for the variables included in our main study with business founders. Table 3 shows the results of multilevel mixed models for both perceived feasibility and perceived desirability. Models 1 and 4 show positive and statistically significant effects of information framing on perceived feasibility ( $\beta=0.55$ ,  $p=0.000$ , 95% CI [0.41, 0.69]) and perceived desirability ( $\beta=0.63$ ,  $p=0.000$ , 95% CI [0.47, 0.78]), respectively. These fixed-effect coefficients have effect sizes

of  $f^2=0.31$  and  $f^2=0.30$ , respectively, thus corroborating the results from the pilot study and lending further support to Hypothesis 1. The other models in Table 3 show that the effect of information framing on perceptions of feasibility and desirability remains significant even after the introduction of other variables in the model. Hypothesis 1, predicting that a positive (negative) framing about an opportunity would enhance (reduce) both perceived feasibility and perceived desirability, is therefore fully supported.

In addition, model 2 in Table 3 shows that religious belief integration does not have a significant direct effect on perceived feasibility ( $\beta=0.17$ , *n.s.*, 95% CI [-0.05, 0.38]), whereas model 5 shows a significant direct effect on perceived desirability ( $\beta=0.23$ ,  $p=0.037$ , 95% CI [0.01, 0.44]). Most importantly, models 3 and 6 show that the interaction term between religious belief integration and information framing is statistically significant for both perceived feasibility ( $\beta=-0.11$ ,  $p=0.024$ , 95% CI [-0.21, -0.02]) and perceived desirability ( $\beta=-0.15$ ,  $p=0.007$ , 95% CI [-0.27, -0.04]). The effect size of this interaction term is  $f^2=0.02$  for feasibility and  $f^2=0.03$  for desirability, which is considered relatively small by Cohen's (1988) standards, yet still relevant given our within-subject research design. The negative coefficients of the interaction term lend support to Hypothesis 2, suggesting that religious belief integration moderates the effect of information framing such that higher levels of the former will increase perceived feasibility and desirability when the latter is negative.

Since the interpretation of interaction effects is not straightforward, we conducted separate regressions per experimental condition (i.e., per information framing) to better understand such effects. Table 4 shows the results of mixed models conducted separately for negative and positive information framing on perceived feasibility and desirability. Model 1 shows a positive and significant effect of religious belief integration on perceived feasibility when information framing is negative ( $\beta=0.34$ ,  $p=0.024$ , 95% CI [0.05, 0.64]), whereas model 2 shows a non-significant coefficient when information framing is positive ( $\beta=-0.02$ , *n.s.*, 95% CI [-0.23, 0.19]). Models 3 and 4 reveal a similar pattern for perceived desirability: Religious belief integration has a positive and significant effect when information framing is negative ( $\beta=0.48$ ,  $p=0.004$ , 95% CI [0.16, 0.81]), but a

<sup>5</sup> For both the pilot and the main study, we also tested different specifications of the random-effects equation (e.g., with an unstructured covariance matrix) and found that our results are robust to these different specifications.

<sup>6</sup> Multilevel mixed models offer a general approach to modeling repeated-measures data that encompasses both ANOVA and repeated-measures regression approaches, with advantages in terms of flexibility, estimate accuracy, and ability to handle multiple continuous and categorical independent variables (Misangyi et al., 2006; Noortgate & Onghena, 2006; Wallace & Green, 2002). Indeed, since our design was balanced and sample size relatively large, we obtained similar results using ANOVA as well as the repeated-measures regression approach (Lorch & Myers, 1990).

<sup>7</sup> We calculated Cohen's  $f^2$  effect size following Selya et al. (2012). According to Cohen's (1988) guidelines,  $f^2 \geq 0.02$ ,  $f^2 \geq 0.15$ , and  $f^2 \geq 0.35$  represent small, medium, and large effect sizes, respectively. Given that our within-subject, repeated-measures design is likely to reduce effect sizes (because of carryover effects), we believe that even a small effect size in our design might have practical relevance.

**Table 2** Descriptive statistics and correlations from the main study

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11
<i>Control</i>													
1. Gender	0.28	0.45											
2. Age	40.62	14.52	-0.08										
3. Entrepreneurial experience	0.82	0.38	<b>-0.31</b>	<b>0.20</b>									
4. Currently in a start-up process	0.47	0.50	0.07	-0.03	<b>-0.49</b>								
5. Education level	3.43	0.67	-0.05	<b>0.38</b>	<b>0.13</b>	0.06							
6. Start-up knowledge	3.51	1.02	<b>-0.35</b>	<b>0.44</b>	<b>0.38</b>	-0.01	<b>0.30</b>						
<i>Exogenous</i>													
7. Information framing	0.00	1.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00				
8. Religious belief integration	3.05	1.37	<b>0.34</b>	0.09	<b>-0.27</b>	<b>0.15</b>	<b>-0.11</b>	<b>-0.18</b>	-0.00				
<i>Endogenous</i>													
9. Initial feasibility	5.54	1.56	0.11	0.07	<b>-0.17</b>	<b>0.13</b>	-0.09	<b>-0.25</b>	0.04	0.05			
10. Initial desirability	6.15	1.97	0.05	0.01	-0.06	<b>0.12</b>	<b>-0.14</b>	<b>-0.18</b>	0.06	0.01	<b>0.65</b>		
11. Final feasibility	6.37	1.78	<b>0.15</b>	-0.08	<b>-0.17</b>	0.08	<b>-0.18</b>	<b>-0.22</b>	<b>0.32</b>	<b>0.17</b>	<b>0.48</b>	<b>0.44</b>	
12. Final desirability	6.74	2.02	0.02	-0.12	-0.11	0.10	<b>-0.19</b>	<b>-0.16</b>	<b>0.33</b>	<b>0.14</b>	<b>0.40</b>	<b>0.55</b>	<b>0.82</b>

All correlations in bold are significant at the 5% level

**Table 3** Multilevel mixed-effects modeling

	Perceived feasibility			Perceived desirability		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Control variables</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Endogenous</i>						
Initial feasibility	0.38*** (0.06)	0.38*** (0.06)	0.39*** (0.06)			
Initial desirability				0.42*** (0.05)	0.43*** (0.05)	0.44*** (0.05)
<i>Exogenous</i>						
Information framing	0.55*** (0.07)	0.55*** (0.07)	0.57*** (0.07)	0.63*** (0.08)	0.63*** (0.08)	0.66*** (0.08)
Religious belief integration		0.17 (0.11)	0.17 (0.11)		0.23* (0.11)	0.23* (0.11)
<i>Interaction</i>						
Information framing × religious belief integration			−0.11* (0.05)			−0.15** (0.06)
Log restricted likelihood	−465.68	−465.84	−465.37	−493.44	−492.61	−490.99
Wald $\chi^2$	121.10***	124.11***	131.09***	148.55***	156.25***	166.67***
Df	8	9	10	8	9	10
No. of observations	268	268	268	268	268	268
No. of groups/participants	68	68	68	68	68	68

All models are multilevel mixed-effects REML regressions that include random effects for participants. Fixed-effects parameters are reported with standard errors in parentheses

\* $p < 0.05$

\*\* $p < 0.01$

\*\*\* $p < 0.001$

**Table 4** Multilevel mixed-effects modeling per information framing (negative vs. positive)

	Perceived feasibility		Perceived desirability	
	Negative	Positive	Negative	Positive
<i>Information framing</i>				
	(1)	(2)	(3)	(4)
<i>Control variables</i>	Yes	Yes	Yes	Yes
<i>Endogenous</i>				
Initial feasibility	0.35*** (0.07)	0.42*** (0.07)		
Initial desirability			0.45*** (0.08)	0.45*** (0.05)
<i>Exogenous</i>				
Religious belief integration	0.34* (0.15)	−0.02 (0.11)	0.48** (0.17)	−0.03 (0.09)
Log restricted likelihood	−235.88	−221.60	−261.28	−205.76
Wald $\chi^2$	33.89***	53.47***	46.92***	112.02***
Df	8	8	8	8
No. of observations	135	133	135	133
No. of groups/participants	68	68	68	68

All models are multilevel mixed-effects REML regressions that include random effects for participants. Fixed-effects parameters are reported with standard errors in parentheses

\* $p < 0.05$

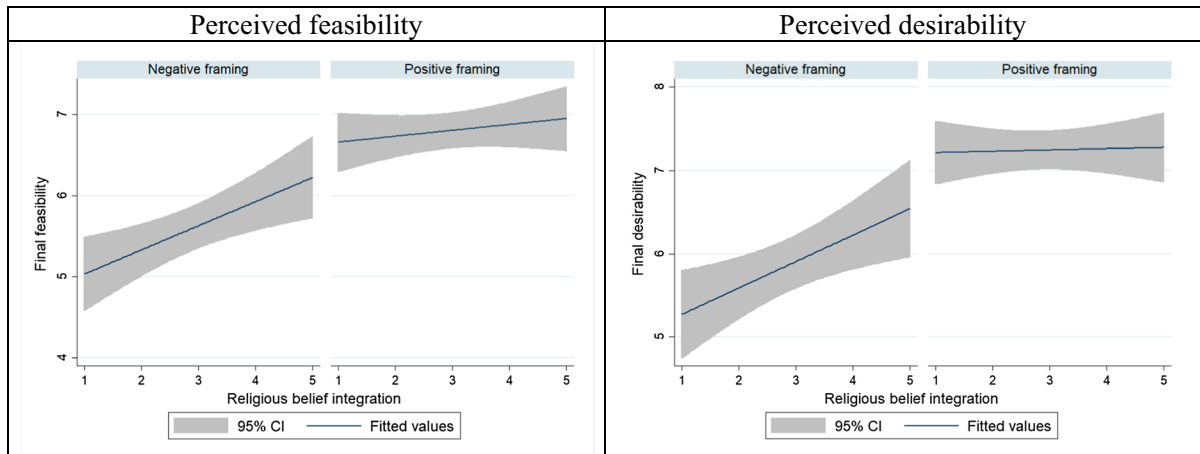
\*\* $p < 0.01$

\*\*\* $p < 0.001$

non-significant effect when information framing is positive ( $\beta = -0.03$ , *n.s.*, 95% CI [−0.21, 0.15]). The effect sizes of religious belief integration when information framing is negative are  $f^2 = 0.01$  for feasibility and  $f^2 = 0.03$  for desirability. Albeit small, these effect sizes are substantively relevant given that our

within-subject experimental design is likely to reduce effect sizes because each participant was prompted with four versions of the same business opportunity. Hypothesis 2 is therefore supported.

Table 5 shows linear prediction plots for perceived feasibility and perceived desirability regressed on

**Table 5** Linear prediction plots of dependent variables on religious belief integration per information framing (negative vs. positive)


religious belief integration, along with a 95% confidence interval. The different slopes suggest indeed that perceived feasibility and perceived desirability increase with religious belief integration, and more so in the experimental conditions where entrepreneurs received negatively framed information about the new venture opportunity.

#### 4.3 Robustness tests

We conducted a series of additional analyses to test the robustness of our findings to alternative analytic and sample specifications. First, we repeated our analysis, including the non-founders who also participated in our experiment. This yielded a larger sample and substantively similar results: Both Hypotheses 1 and 2 were corroborated, although the coefficients of religious belief integration and the interaction term became less significant, reflecting the specificity of our adaptation of the FWS to business founders. Second, we conducted analyses using shorter versions of the FWS (i.e., eliminating redundant items without losing scale reliability). Again, both hypotheses were supported. Third, we used ANOVA and the repeated-measures regression approach suggested by Lorch and Myers (1990). Since we had a balanced research design and a relatively large sample size, we obtained equivalent results. Finally, we explored the linearity of religious belief integration's effects on both perceived feasibility and perceived desirability. Two-way plots of the cubic spline relating both perceived feasibility and perceived desirability to religious

belief integration per experimental condition were consistent with the linear prediction plots shown in Table 5, but also suggested a potential exponential relationship between religious belief integration and the two dependent variables. We, therefore, again ran the mixed models shown in Tables 3 and 4, this time replacing the religious belief integration variable with an exponential function of the average score obtained in our adapted FWS. The results supported Hypotheses 1 and 2 again, showing even more significant coefficients: The direct effect of religious belief integration became significant even in the presence of the interaction term (for both perceived feasibility and perceived desirability) and was again significant when information framing was negative and non-significant when information framing was positive.<sup>8</sup> These additional analyses indicate that perceived feasibility and perceived desirability are indeed fostered by religious belief integration when opportunity cues are negatively framed, and more so at high levels of religious belief integration.

## 5 Discussion

We built on a process perspective of entrepreneurial cognition to examine how mental representations and cognitive resources stemming from deep anchoring

<sup>8</sup> Detailed results of our robustness tests are available upon request.

beliefs affected the perceived feasibility and desirability of entrepreneurial action. In so doing, we specified the role of religion and extended research on the cognitive perspective of entrepreneurial action. In the following sections, we discuss the theoretical and practical implications of our findings as well as the limitations and avenues for future research.

### 5.1 Specifying the role of religion in entrepreneurship

Our research contributes to theory by extending the theological turn (Smith et al., 2021a, 2021b) to entrepreneurship research through more complete theoretical and empirical specification of the role of religion in entrepreneurial action. One of the challenges of understanding the role of religion in entrepreneurship is its limited specification with existing theoretical frameworks (Balog et al., 2014). To address this challenge, we leveraged the theory of entrepreneurial action, with a specific focus on opportunity evaluation (McMullen & Shepherd, 2006). We also built upon previous research on entrepreneurial cognition that underscores the importance of deep cognitive structures and deep anchoring beliefs in shaping individual attitudes, intentions, and actions (Krueger, 2007; Krueger & Day, 2010). We argued that religious beliefs are exactly the type of deep anchoring beliefs underlying deep cognitive structures and then integrated the cognitive process of *sanctification* (Mahoney et al., 2021) within this entrepreneurial action framework to improve theoretical precision about how and why religion may affect perceived feasibility and perceived desirability of entrepreneurial action. Sanctification, coupled with the understanding that religion affects deeply anchored beliefs at the basis of deep cognitive structures, provides a theoretical rationale for religious influence within a well-specified theoretical framework of entrepreneurial action.

In so doing, we responded to the calls for greater theoretical specification (Klein, 2014) and identification of moderator relationships to “improve the understanding of religion’s influence on entrepreneurship” (Block et al., 2020: 619). Specifically, we found that religion (belief integration) moderated the relationship between framing and perceived feasibility/desirability. This approach offers a cognitive explanation for the reconciliation of previous findings

by specifying a contingent, rather than universal, relationship between religion and entrepreneurship. If the influence of religion on opportunity assessments is contingent on both the framing and the degree of religious belief integration, research measuring religiousness and entrepreneurial activity at an aggregate level *is likely to generate potentially spurious results* because it neglects important cognitive phenomena.

In this way, we open the door for future research on religion and entrepreneurship from a cognitive perspective. First, we complement prior theoretical research on institutional logic that calls for greater theoretical specification on the role of religion and entrepreneurship with research on entrepreneurial action (e.g., Gümüşay, 2020). While we examine how religion affects the perceived feasibility and desirability of entrepreneurial action, future research could examine the role of religion in noticing specific problems, including some (and not other) solutions, and assessing feedback for persistence in action (Smith et al., 2019). Second, our study acknowledges the role of religion as an important rationality for taking entrepreneurial action that may augment the dominant economic paradigm (Smith et al., 2021a, 2021b). However, additional research is needed to understand how cognitive evaluations and trade-offs are made among competing and/or complementary rationalities. This may include how an entrepreneur reconciles the *coherence* (or lack thereof) between rationalities including representations from the environment with their own deep cognitive and value structures, the top-down and bottom-up processing methods, the mechanisms of matching and updating, and the magnitude or speed of attention in the formation of third- and first-person opportunities (Shepherd et al., 2007). Third, we introduce the psychological process of *sanctification* into the theory of entrepreneurial action. Yet, the process of sanctification is not limited to opportunity evaluation and may be fruitfully extended to more fully understand a range of cognitive entrepreneurial processes. For example, how does sanctification influence the processes of identity formation and interaction (e.g., Mmbaga et al., 2020), cultural entrepreneurship including entrepreneurial sensegiving and sensemaking (e.g., Navis & Glynn, 2011), investor decision-making (Chircop et al., 2020; Smith et al., 2022), and entrepreneurial failure and recovery (e.g., Cardon et al., 2011; Smith et al., 2021a, 2021b)?

From an empirical perspective, we extend research in two important ways. While research has begun to theorize about how religion may influence the perceived feasibility and perceived desirability of entrepreneurial action (Smith et al., 2019), we add one of the first empirical tests of these relationships. As such, we conduct research that provides evidence of such relationships and allows for future aggregation of knowledge through meta-analysis. Through empirical testing, we add empirical support for the moderating role of religion influencing the feasibility and desirability of entrepreneurial action. Using an experimental design, we also augment extant conceptual, qualitative, and quantitative studies that do not allow for causal statements on religion and entrepreneurship. Indeed, experiments are particularly well suited for the making of causal inferences (Shadish et al., 2002), and our research design specifically avoids the endogeneity problems that are common with non-experimental research on religion and entrepreneurship (Block et al., 2020).

Moreover, we add to the empirical specification of the relationship between religion and entrepreneurship through the use and adaptation of existing measures of religion. According to a review of the literature on religion and entrepreneurship, the complexity of religious constructs and the presence of contradictory empirical results “illustrate the importance of consistent operationalization of researched constructs” (Balog et al., 2014: 20). To that end, we adapted a previously developed and validated measure of religious integration at work (Lynn et al., 2009) to the context of entrepreneurship. This approach resulted in a highly reliable measure of religious belief integration of the entrepreneurial venture and strengthened the confidence in our empirical testing and results.

Future research on religion and entrepreneurship could benefit from additional experiments and more use of existing religious measures from established disciplines (e.g., psychology, sociology, and economics) or the development and validation of new religious measures. Overall, we hope this approach of more complete theoretical and empirical specification leads to stronger research designs and additional studies in top-tier entrepreneurship and management journals.

## 5.2 Process orientation of cognitive perspective in entrepreneurship

Our results also contribute to theory by extending a process orientation of the cognitive perspective in entrepreneurship. Prior research has been criticized for under-specifying theoretical articulations of key conceptual elements of the entrepreneurial cognitive perspective (Grégoire et al., 2011). Specifically, extant research has largely focused on *either* mental representations of information signals *or* cognitive resources relevant to entrepreneurial efforts. Answering the call for a more complete specification, we *simultaneously* incorporate *both* mental representations (framing) *and* cognitive resources (religious beliefs) into our study. In so doing, we take a step toward opening the “black box” of the cognitive processes of opportunity evaluation of perceived feasibility and desirability of entrepreneurial action.

Our focus on a process orientation also calls attention to the antecedents of perceived feasibility and desirability in the theory of entrepreneurial action. While extant research generally focuses on feasibility and desirability as independent variables of entrepreneurial action (e.g., Unger et al., 2011), much less theoretical and empirical attention has focused on feasibility and desirability as dependent variables. If deep anchoring beliefs lie indeed beneath deep cognitive structures that influence entrepreneurial attitudes, intentions, and actions (Krueger, 2007), entrepreneurship scholars might benefit from a better understanding of how religion influences such deep anchoring beliefs and how they surface in entrepreneurial action. Our study provides a theoretical explanation through the process of sanctification and the interplay between opportunity cues and religious belief integration for the influence of these deep anchoring beliefs. It also provides a rigorous empirical test, showing how deep beliefs moderate the effect of opportunity framing on perceptions of feasibility and desirability. In so doing, our study calls attention to the consideration of possible intervening variables between third-person opportunities and the assessment of perceived feasibility and desirability in the theory of entrepreneurial action (McMullen & Shepherd, 2006). In such a theory, opportunity beliefs are mental images about the potential reward for a particular action versus the cost of that action (McMullen & Shepherd, 2006). In order to form such mental images, entrepreneurs must



interpret environmental cues and “connect the dots” (Baron, 2006) to develop a mental prototype (Baron & Ensley, 2006) or an image of the situation (Mitchell & Shepherd, 2010; Shepherd et al., 2007) that can be tested (Shepherd et al., 2012). To do so, entrepreneurs employ a set of cognitive skills (Wood et al., 2012) and decision-making rules (Williams & Wood, 2015; Wood & Williams, 2014) that can be more or less automatic or deliberate in nature (Krueger & Day, 2010). In this whole process of opportunity evaluation, perceptions of feasibility and desirability are affected not only by the quality and framing of the information one receives/gathers (as we have shown) but also by the cognitive resources one has since mental prototypes, cognitive skills, and decision-making rules are all influenced by deep anchoring beliefs (Krueger, 2007; Krueger & Day, 2010). Religious beliefs are likely to be part of such deep anchoring beliefs, and our study makes a step toward understanding their effects more fully.

### 5.3 Limitations and future research

There are several important limitations of our study which lead to opportunities for future research. First, in order to test our hypotheses, we adopted a systematic research design to contrast the effects of framing and test under which conditions religious belief integration played a significant role in opportunity evaluation. A systematic design such as ours places a strong emphasis on internal validity, allowing for robust causal inferences and hypothesis testing. However, it might also present trade-offs in terms of external validity, i.e., the generalizability of our inferences beyond the circumstances under which they were observed (Dhimi et al., 2004; Grégoire et al., 2019). Having an entrepreneurial sample adds to the external validity of our main study. However, one could still argue that using a representative design including stimuli randomly selected from the respondents’ environment would further increase external validity and hence be worth pursuing. We agree and conjecture that such types of stimuli could foster the effects of religious belief integration.

Second, our data were collected in a few geographic locations within the USA, and the results may not generalize to other contexts in which religion is more or less integral in society. There is variance in levels of religiosity across regions within the USA

and across different parts of the globe, as well as across generations (Pew Research Center, 2008, 2012, 2017), but exploring such variance was beyond the scope of our study. We found no significant results for age in all our analyses, and participants in our main study were relatively homogeneous in terms of geographical location. Since previous research suggests that religious influences on entrepreneurship might also be affected by socio-cultural factors (e.g., Valliere, 2008), future research might indeed explore such regional variations in religiosity using a multilevel approach. Additionally, while our study examined religious belief integration, we did not differentiate between beliefs within or between different religions. Future research can contribute by testing the belief integration commonalities and differences within and across religions (Giacomin et al., 2022).

Third, although our measure of religious belief integration assessed the degree to which entrepreneurs integrated their religious beliefs and practices within their businesses, our research design does not allow us to assess whether such beliefs are collectively shared in the workplace or in the communities they live. Shared spiritual beliefs (in entrepreneurial teams or at the community level) could have an even stronger impact on opportunity evaluation and entrepreneurial action, which constitutes an interesting avenue for future research (Smith et al., 2023a, 2023b). Relatedly, deep beliefs that are collectively shared and taken for granted do not need to be spiritual or religious to have an impact on opportunity evaluation and entrepreneurial action and might as well constitute interesting material for further investigation.

Fourth, our measure of religious belief integration presented items that had a generally positive connotation, i.e., it did not contain any item such as “I see failure in my business as spiritual failure.” One might wonder whether this could influence our finding that religious belief integration is particularly important when entrepreneurs are faced with negatively framed information. Since our measure focuses on assessing the degree to which entrepreneurs integrate their religious beliefs with their business rather than on assessing a positive feeling such as optimism, we contend this is not the case. However, the literature on framing effects consistently shows that the wording of any question influences the answers one gets. Hence, future research examining the framing effects

of measurement scales might yield very interesting results, particularly exploring the framing of different religious beliefs and their consequences for entrepreneurial action.

Finally, our study involved a hypothetical experiment in which respondents made evaluations about opportunities that involved no real investment of time, funds, or effort. We argue that the effects we found in our within-subject experiment may be amplified in real life, where (a) entrepreneurs see only one formulation of the problem, (b) there is always a certain degree of uncertainty to be further reduced, and (c) religious and non-religious people tend to receive considerably different types of stimuli. However, we acknowledge that further research is needed to test such arguments.

#### 5.4 Practical implications and future research

As the movement of entrepreneurs and investors integrating their religion into their entrepreneurial practices continues (Smith et al., 2019, 2023a, 2023b), our study highlights important practical considerations. Religious belief integration may instill entrepreneurs with the confidence to carry on when faced with daunting uncertainty or odds of success. While some studies find religion may lead to risk aversion, we find – when properly specified – religion leads to more positive assessments of feasibility and desirability in the face of uncertainty.

Yet, these assessments may (not) lead to greater accuracy and success of entrepreneurial action. Religious belief may lead to greater perseverance and action, but sometimes, that action may be viewed more optimistically than is practical. Research has systematically found that entrepreneurs are overly optimistic (Cassar, 2010), that their hindsight bias hinders their ability to learn from experience and overcome excessive optimism (Cassar & Craig, 2009), and that such overoptimism negatively affects their performance (Hmieleski & Baron, 2009). Research has also shown that such overoptimism and overconfidence can be fostered by information framing (Dubard Barbosa et al., 2019). Our study completes this line of research by showing that religious beliefs might not help either in debiasing framing effects or in reducing overoptimism and overconfidence. Instead, it might create optimism by itself, even in the face of more

negatively framed information. Whether this is good or bad for entrepreneurial performance might depend on a set of additional factors, which further research could investigate by examining the relationship between religious beliefs and entrepreneurial success or failure. A recent study has shown, for instance, that a relational identity with God helps entrepreneurs navigate the highs and lows of the entrepreneurial process and face identity threats not only in bad times but also during the good ones (Smith et al., 2023a, 2023b).

The study of religion invites us to move from an economic paradigm to a more holistic one (Smith et al., 2021a, 2021b). Hence, we encourage further research on the relationship between religion and entrepreneurial performance to adopt a more holistic view of what performance and success really mean. One interesting avenue for this type of research with significant practical relevance is to investigate the effects of religious belief integration in terms of well-being and mental and physical health. This research effort could contribute to connecting research on the theological turn with research on entrepreneurs' health (Torrès & Thurik, 2019) and make use of the methodological tools of neuroscience to include the biological level and thus complete the primarily social and cognitive levels of our theories thus far (McMullen et al., 2014). Indeed, neuroscientific studies have shown the positive effects of religious beliefs and practices in dealing with anxiety and coping with stress and uncertainty (e.g., Inzlicht et al., 2009; Newberg & Waldman, 2009). This is consistent with our findings, as well as with previous studies on mindfulness (Murnieks et al., 2020). A more complete research agenda with the potential to expand the frontiers of neuroentrepreneurship research (de Holan, 2014; Krueger & Day, 2010) could investigate the effects of religious beliefs and practices on a more holistic view of entrepreneurs' performance (including health and well-being), also being attentive to the potential recursive loops between performance and cognition over time.

**Acknowledgements** We would like to thank two anonymous reviewers and the guest editors of the Entrepreneurship and Religion SBEJ Special Issue for their valuable comments and guidance through the review process. All remaining errors, if they exist, are our own.

## Appendix 1 Religious belief integration items

- 
- RB1. I sense God's presence in my business  
 RB2. I view my business as a partnership with God  
 RB3. I think of my business as having eternal significance  
 RB4. I see connections between my worship and my business  
 RB5. My faith helps me deal with difficult business relationships  
 RB6. I view my business as a mission from God  
 RB7. I sense that God empowers me to do good things in my business  
 RB8. I pursue excellence in my business because of my faith  
 RB9. I believe God wants me to develop my abilities and talents in my business  
 RB10. I view my stakeholders as being made in the image of God  
 RB11. My stakeholders know I am a person of faith  
 RB12. I sacrificially love the stakeholders I do business with  
 RB13. When I am with others and alone, I practice purity in my business habits  
 RB14. I view my business as part of God's plan to care for the needs of people  
 RB15. I view myself as a caretaker not an owner of my money, time and resources
- 

*Adapted from Lynn et al. (2009)*

## Appendix 2 Correlation matrix of religious belief integration items

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Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RB1	1														
RB2	0.92	1													
RB3	0.67	0.68	1												
RB4	0.86	0.85	0.65	1											
RB5	0.80	0.79	0.50	0.80	1										
RB6	0.87	0.92	0.75	0.87	0.77	1									
RB7	0.89	0.90	0.65	0.84	0.84	0.90	1								
RB8	0.83	0.80	0.62	0.79	0.89	0.82	0.87	1							
RB9	0.83	0.81	0.60	0.79	0.84	0.81	0.94	0.88	1						
RB10	0.75	0.84	0.59	0.73	0.77	0.81	0.82	0.80	0.82	1					
RB11	0.81	0.82	0.62	0.74	0.84	0.81	0.79	0.85	0.77	0.82	1				
RB12	0.68	0.70	0.68	0.76	0.72	0.75	0.70	0.74	0.70	0.74	0.76	1			
RB13	0.50	0.49	0.40	0.51	0.57	0.52	0.53	0.53	0.54	0.50	0.55	0.55	1		
RB14	0.85	0.89	0.63	0.86	0.83	0.91	0.93	0.83	0.88	0.81	0.77	0.69	0.57	1	
RB15	0.62	0.66	0.55	0.63	0.56	0.67	0.60	0.57	0.55	0.62	0.59	0.67	0.53	0.65	1

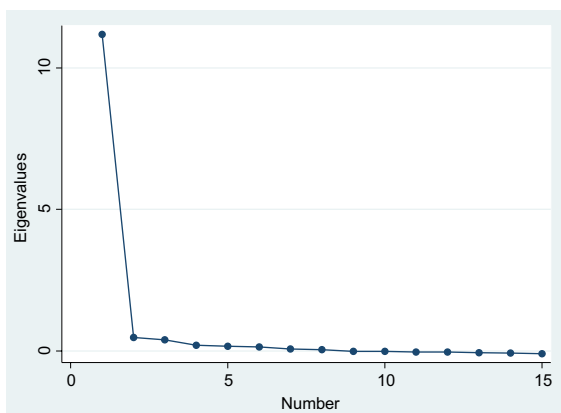
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All correlations are significant at the 5% level

### Appendix 3 Factor analysis of religious belief integration scale

Our measure of religious belief integration consisted of 15 items adapted from the Faith at Work Scale (FWS). Although previous research has consistently shown that the FWS is unidimensional (e.g., Lynn et al., 2009, 2010), it is good practice to investigate the underlying factor structure of any scale with new data before computing Cronbach's alpha and proceeding to the main analysis (Anderson & Gerbing, 1988; DeVellis, 2003; Gerbing & Anderson, 1988). Therefore, we conducted a factor analysis of our religious belief integration items (exhibited in Appendix 1) before conducting our main analyses.

Since "exploratory factor analysis provides a more rigorous replication test than confirmatory analysis" (Saucier & Goldberg, 1996, p. 35), i.e., obtaining consistent results from traditional factoring methods is often considered stronger confirmatory evidence than demonstrating good model fit (DeVellis, 2003), we opted to conduct an exploratory factor analysis using the principal factors method. The principal factors method is preferable over the principal component because it provides a more robust test of the unidimensional hypothesis since it is aimed at explaining common variance (i.e., variance shared by the items) rather than extracting total variance (Pedhazur & Schmelkin, 1991). In addition, it assumes items are reflective rather than formative.



**Fig. 1** Scree plot of religious belief integration scale

**Table 6** Factor loadings (pattern matrix) and unique variances

Item	Factor loading	Uniqueness
RB1	0.92	0.16
RB2	0.94	0.13
RB3	0.71	0.49
RB4	0.90	0.20
RB5	0.89	0.22
RB6	0.94	0.11
RB7	0.95	0.10
RB8	0.91	0.17
RB9	0.91	0.17
RB10	0.87	0.24
RB11	0.88	0.22
RB12	0.82	0.33
RB13	0.59	0.64
RB14	0.93	0.13
RB15	0.70	0.51

Specifically, we proceeded in two steps. First, we tested the adequacy of the data for factor analysis. The Kaiser-Meyer-Olkin statistic exceeded the recommended minimum threshold of 0.6 ( $KMO=0.94$ ), and Bartlett's Test of Sphericity was significant ( $\chi^2=1378.93$ ,  $df=105$ ,  $p=0.000$ ), indicating that the data contained adequate correlations to factor. Second, we conducted a principal factors analysis specifying that only factors with a minimum eigenvalue of 1 should be retained (as recommended by Kaiser, 1960). The unrotated solution showed that one single factor with an eigenvalue of 11.18 explained 90.81% of the common variance. All other factors exhibited eigenvalues below the minimum threshold of 1, clearly suggesting that they should not be retained (Kaiser, 1960). An examination of the scree plot shown in Fig. 1 further corroborated that a one-factor solution best fits the data. Such a clear pattern provides compelling evidence for retaining only one factor and makes the use of more sophisticated methods for factor retention decisions, such as parallel analysis (Hayton et al., 2004), unnecessary. The pattern matrix (see Table 6) shows that all items exhibit factor loadings above 0.50 and well above their own uniqueness (with only one exception), providing further evidence that the scale is unidimensional and reliable.

#### Appendix 4 Descriptive statistics and correlations from pilot study

Variable	Coding/value range	M	SD	1	2	3	4	5	6	7	8
<i>Control</i>											
1. Gender	1 = male; 2 = female	1.46	0.50								
2. Age	Min. = 18; max. = 56	21.68	3.76	<b>0.15</b>							
3. Entrepreneurial experience	1 = yes; 0 = no	0.11	0.32	<b>-0.13</b>	<b>0.23</b>						
4. Currently in a start-up process	1 = yes; 0 = no	0.09	0.29	<b>-0.08</b>	<b>0.18</b>	<b>0.25</b>					
5. Parents self-employed	1 = at least one parent; 0 = none	0.44	0.50	0.01	0.01	<b>0.06</b>	<b>0.05</b>				
6. Employment experience (years)	Min. = 0; Max. = 31	3.63	3.84	0.04	<b>0.68</b>	<b>0.21</b>	<b>0.17</b>	0.01			
<i>Exogenous</i>											
7. Information framing	-1 = negative; 1 = positive	0.00	1.00	-0.00	0.00	0.00	0.00	-0.00	0.00		
<i>Endogenous</i>											
8. Feasibility	1 = not feasible at all; 7 = very feasible	4.88	1.41	-0.02	0.03	0.00	<b>0.09</b>	0.04	0.04	<b>0.39</b>	
9. Desirability	1 = not attractive at all; 7 = very attractive	4.80	1.63	-0.03	<b>0.06</b>	0.03	<b>0.10</b>	0.02	<b>0.07</b>	<b>0.42</b>	<b>0.80</b>

All correlations in bold are significant at the 5% level. Control variables also included dummies for education level and area of study

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