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To cite this article: Sung Joon Jang, Byron R. Johnson & Matthew Lee Anderson (2024) Virtuous effects of religion on negative emotions among offenders in a Colombian prison, Journal of Crime and Justice, 47:2, 280-298, DOI: [10.1080/0735648X.2023.2249439](https://doi.org/10.1080/0735648X.2023.2249439)


To link to this article: <https://doi.org/10.1080/0735648X.2023.2249439>

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# Virtuous effects of religion on negative emotions among offenders in a Colombian prison

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## ABSTRACT

Although prior research documents a positive relationship between religious involvement and emotional well-being among incarcerated individuals, the salutary effect of religion on mental health remains in need of scientific scrutiny. To examine this understudied issue, we hypothesized that prisoner religiosity is positively associated with virtues, which are in turn inversely related to negative emotions. To test this hypothesis, we applied structural equation modeling to analyze data from a survey with a convenience sample of 139 males housed at a Colombian prison. As hypothesized, we found that both public (religious service attendance) and private religious behaviors (praying and reading a sacred book) were positively associated with the virtues of forgiveness, self-control, and gratitude. Additionally, we found that forgiveness and self-control were inversely related to state anger, depression, and anxiety. Finally, self-control was central in explaining the relationship between religious service attendance and state anger. Implications and limitations of the present findings are discussed.

## ARTICLE HISTORY

Received 5 May 2023  
Accepted 15 August 2023

## KEYWORDS


Prison; religion; virtue;  
negative emotions;  
Colombia

## Introduction

It is well documented that religious involvement or religiosity is positively associated with emotional well-being and inversely related to psychological distress (e.g., Koenig, King, and Carson 2012; Levin 2010; Moreira-Almeida, Neto, and Koenig 2006). The salutary effect of religiosity on mental health, which has been established in numerous studies from diverse disciplines based on various samples of a general population, has also been found among incarcerated individuals (Clear and Sumter 2002; Eytan 2011; Jang et al. 2021). This is a welcome finding that has practical implications for the emotional well-being of incarcerated individuals, given that they have higher rates of mental health problems than the general public (Bronson and Berzofsky 2017; Johnson and Larson 1998; National Institute of Mental Health 2019) and that emotional maladjustment to prison is a risk factor for misconduct and an obstacle to offender rehabilitation (James and Glaze 2006; Jang and Johnson 2022).

To make the case for religion as a programmatic source of enhanced mental health among incarcerated individuals, it is essential to explain the theoretical linkages between involvement in religion and emotional well-being, and then to empirically test these proposed relationships. To address this understudied issue, we intend to explore whether religiosity is likely to reduce negative emotions among prisoners by fostering virtue, which is defined as “good moral character” (Adams 2006, 3). Specifically, we propose to examine

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 Supplemental data for this article can be accessed online at <https://doi.org/10.1080/0735648X.2023.2249439>

whether religiosity is positively related to virtues (forgiveness, self-control, and gratitude), which are in turn inversely associated with the negative emotions (anger, depression, and anxiety), as the virtues are likely to reduce those emotions as well as be incompatible with them. To test this “virtuous effect” of religiosity (Jang et al. 2018), we applied structural equation modeling to analyze data collected from a convenience sample of 139 males housed in a Colombian prison.

This paper begins with a review of the literature on the salutary effect of religion on mental health among incarcerated individuals as well as those in the general population, and also examines research on theoretical rationale for the effect of religion on mental health. Based on the literature review, we then develop hypotheses before describing our sample and data, measurement, and analytic strategy to test the hypotheses. Finally, we present the results from our data analyses and discuss the implications and limitations of our findings.

## Literature review

### *Religion and mental health*

Researchers from diverse disciplines including psychology, epidemiology, and sociology have documented the salutary effect of religiosity on mental health in systematic reviews, meta-analyses, and individual studies using samples of the general population in the United States and other countries (Hackney and Sanders 2003; Koenig, King, and Carson 2012; Levin 2010; Moreira-Almeida, Neto, and Koenig 2006; Sawatzky, Ratner, and Chiu 2005). Scholarly work has typically relied upon measures of public (e.g., religious service attendance) and private religious behaviors (e.g., devotional practices of praying and reading a sacred text), which have been found to be positively associated with mental health, defined in various ways, and inversely related to psychological distress like depression and anxiety.

The same pattern has also been observed among incarcerated individuals. For example, based on a study of males housed at 20 prisons in 12 states, Clear and Sumter (2002) reported that prisoner religiosity was inversely related to depressive symptoms (see also Koenig 1995). Negative relationships between religious involvement and feelings of guilt and hopelessness were found in a study of female prisoners (Aday, Krabill, and Deaton-Owens 2014). More recently, a series of studies conducted by a group of researchers in non-Western countries and the United States added evidence that more religious prisoners tend to report lower levels of negative emotions than their less or non-religious peers (Jang and Johnson 2022; Jang et al. 2018, 2021). While the above studies of prisoners used predominantly Christian samples, one study that utilized a sample in which half of the subjects were Muslims reported that religion helped males in a French prison cope with the strain of incarceration and find inner peace (Mandhuj et al. 2014).

Theoretical explanations of the salutary effect of religiosity on mental health have been proposed. For example, religiosity’s preventive function in relation to psychological distress is attributed in part to social support, which religiosity is likely to generate. That is, religious involvement leads to emotional support from co-religionists, which in turn decreases negative emotions (Hayward and Krause 2014; Jang and Johnson 2004; Mirowsky and Ross 2017). Religiosity also increases a sense of control and meaning, as one accepts God or a transcendent guide for living as the source of efficacy and a sense of purpose that makes one’s life worth living (Jang et al. 2021; Mirowsky and Ross 2017), which in turn reduces the feelings of depression and anxiety. In terms of Agnew’s (2006) general strain theory, religion may help individuals cope with strain – whether failure to achieve positively valued goals, presentation of noxious stimuli, or removal of positive stimuli – in a non-criminal manner by reducing the likelihood of strain generating negative emotions conducive to crime and deviance, with anger being the most criminogenic (e.g., Jang and Johnson 2003; Mandhuj et al. 2014).

## Religion and virtue

From the perspective of Cullen et al.'s (2014) "virtuous prison," a mechanism particularly relevant to prisoners is the "virtuous effect" of religion on emotional well-being (Jang et al. 2018). Most religious traditions promote personal virtues like forgiveness, self-control, and gratitude (Emmons and McCullough 2004; Rye et al. 2000). Specifically, religion fosters virtues by teaching adherents to internalize and practice divine-like qualities. For example, in Abrahamic religious traditions (Judaism, Christianity, and Islam) forgiveness is a way to honor God by imitating God's forgiveness while overcoming self-pity and resentment. In Hinduism and Buddhism, forgiveness is a way to avoid causing more suffering, both for oneself and others, in the world governed by karma. Religion also provides adherents with a self-transcendent narrative that makes virtue worth pursuing even when it runs counter to more self-focused tendencies. For instance, it is instinctive to feel vengeful against someone who has done wrong. A spiritual narrative, however, promotes forgiveness over getting even with the perpetrator. Religion may foster the development of virtues among adherents via the reinforcement and collective practice of virtuous behaviors often found within communities of faith.

Previous studies provide empirical evidence that religion promotes virtues among individuals in the general population (Batson et al. 1999; Emmons and Paloutzian 2003; Krause, Ironson, and Hill 2018; McCullough, Pargament, and Thoresen 2000; Rye et al. 2000). While research on religion and virtue among offenders is underdeveloped, recent studies provide preliminary evidence that is consistent with the literature based on the general population. In a cross-sectional study of males housed at three maximum-security prisons in Texas, Jang et al. (2018) found that religiously involved prisoners were more likely to report forgiveness, compassion, and gratitude than their less or non-religious peers. This research was replicated and expanded in a quasi-experimental study of males in a state jail and a prison of Texas (Jang and Johnson 2022). That is, the longitudinal study showed that an increase in religious involvement was positively associated with an increase in accountability and self-control as well as forgiveness, compassion, and gratitude, whereas it was inversely related to vengefulness. The virtuous effects of religion were also observed among prisoners in Colombia and South Africa and were found to be applicable to females as well as males (Anderson et al. 2022; Jang, Johnson, and Anderson 2022; Jang et al. 2021, 2022).

## Virtue and mental health

Does virtue enhance mental health? In other words, do more virtuous people fare better mentally than their less virtuous counterparts? If so, why? From a human flourishing perspective, virtue is likely to enhance emotional well-being because it is "a central component of flourishing" (VanderWeele 2017, 8149).

There are two traditions in the study of well-being built around two distinct philosophies: one is hedonism, and the other is eudaimonism. Unlike the hedonic view, which defines well-being in terms of pleasure versus pain, the eudaimonic view equates well-being with *eudaimonia* (a Greek word that is composed by *eu*, "good," and *daimon*, "indwelling spirit" or true self), which means the fulfillment of one's true nature or a state of basic human needs being realized (Delle Fave 2020; Ryan and Deci 2001). For example, Aristotle argued that happiness is found when an individual acts according to virtue, because acting virtuously is one of the basic intrinsic needs of humans (VanderWeele 2017), whereas Frankl (1984) posits that meaning in life is an intrinsic human need. Realization of these and other basic needs like autonomy, competence, and relatedness, leads to emotional well-being (Ryan and Deci 2001). Thus, virtue is expected to be positively associated with subjective well-being or happiness, both experiential (a positive affective state) and evaluative (overall life satisfaction), and inversely related to psychological distress (Delle Fave 2020; Ryan and Deci 2001).

Specifically, forgiving a wrongdoer or receiving forgiveness is likely to enhance emotional well-being because it initiates the restoration of a damaged relationship. Similarly, self-forgiveness for one's own wrongdoing is likely to reduce negative emotions associated

with the inappropriate or harmful behavior (e.g., guilt and shame), as it helps reestablish one's personal self-worth (Clear et al. 2000; Krause, Ironson, and Hill 2018). People with high self-control are more likely to have tolerance for frustration and thus less likely to lose their temper and become angry than those with low self-control (Gottfredson and Hirschi 1990; Grasmick et al. 1993). In the context of strain or adversity, self-control is also likely to decrease depression and anxiety by increasing coping self-efficacy (Bandura 2010; Fuchs and Rehm 1977). In addition, since gratitude is a positive attitude (i.e., affect) regarding undeserved benefits, it is likely to be positively related to subjective well-being and inversely to negative emotions (Emmons and McCullough 2003; Froh, Sefick, and Emmons 2008).

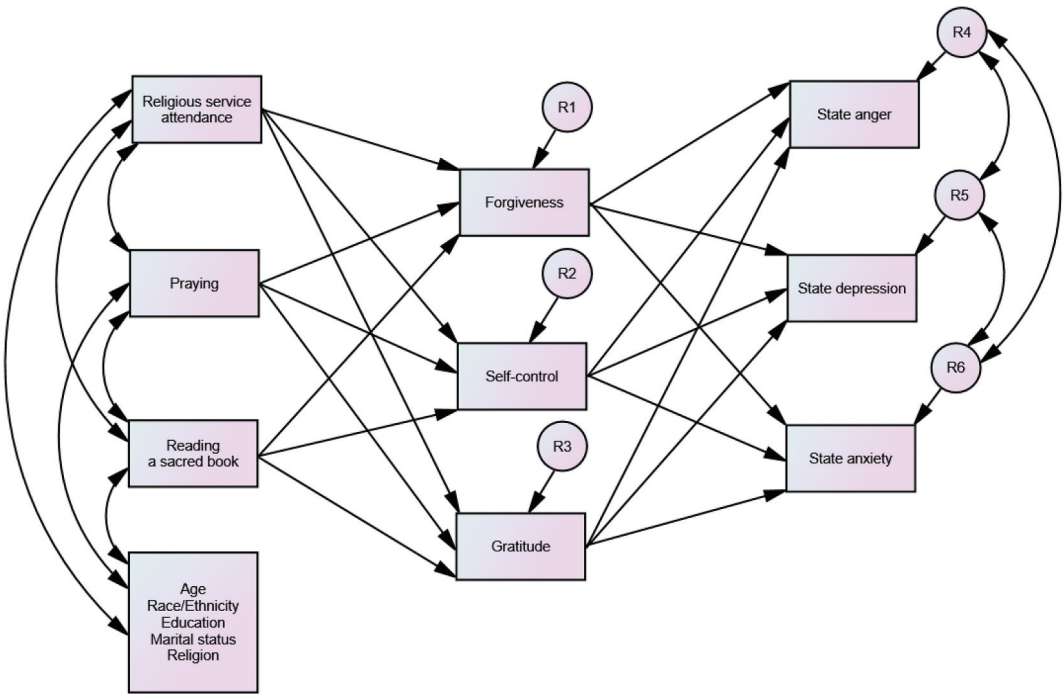
Prior research on well-being and emotions provides evidence that positive affect is an outcome of eudaimonic living (Ryan and Deci 2001). For example, using various samples of college students, adults, and pain clinic participants, Ryan and Frederick (1997) found that indicators of eudaimonic well-being, such as "self-actualization" (one's experienced growth and expression of the self) and "self-determination" (a sense of personal autonomy), were positively related to "subjective vitality" (a positive feeling of aliveness and energy), which was negatively correlated with depression and anxiety. While it has been studied less often than other dimensions of eudaimonic well-being (VanderWeele 2017), virtue has also been related positively to mental health in the general population (Emmons and McCullough 2003; McCullough 2000).

Prior research on prisoners provides some evidence of inverse relationships between virtues and negative emotions as well. For instance, cross-sectional and longitudinal studies of males housed in correctional facilities in Texas indicate that forgiveness, self-control, and gratitude were inversely related to state depression and anxiety (Jang and Johnson 2022; Jang et al. 2018). Inverse relationship between self-control and a composite measure of negative emotional states (anger, depression, anxiety, and frustration) was also found among females as well as males in South Africa and Colombia (Jang et al. 2021; Jang, Johnson, and Anderson 2022).

## Hypotheses

Based on the above literature reviews, we constructed a structural equation model, shown in Figure 1, to test whether prisoner involvement in religion is inversely related to negative emotional states due in part to the acquisition of virtues fostered by religious involvement. Specifically, we hypothesize that prisoner religiosity, public (religious service attendance) and private religious behaviors (praying and reading a sacred book), will be positively associated with virtues (forgiveness, self-control, and gratitude) (**Hypothesis 1**). We also hypothesize that virtues will be inversely related to negative emotional states (anger, depression, and anxiety) (**Hypothesis 2**). In addition, we will examine whether the relationships between religious behaviors and negative emotional states are significantly mediated by those virtues.

As implied by rectangles in the figure, all concepts will be measured by manifest (i.e., observed) variables, while we also estimate a supplementary model, where some of the concepts will be specified as latent variables (see our explanation of why we focus on the manifest-variable model in the methods section and results from estimating the latent-variable model in the results section). To avoid visual clutter, the model does not show all structural relationships to be estimated, although it is saturated (i.e., fully identified). For example, causal paths from religious behaviors to negative emotional states as well as those from sociodemographic controls to both mediating and ultimate endogenous variables are not shown. For the same reason, covariances among the residuals of mediating endogenous variables (i.e.,  $R_1$ ,  $R_2$ , and  $R_3$  in Figure 1) are not shown, while those of the ultimate endogenous variables ( $R_4$ ,  $R_5$ , and  $R_6$ ) are included in the model.



**Figure 1.** A theoretical model of religiosity, virtues, and negative emotional states. Note. To avoid visual clutter, not all structural relationships are shown although the model is fully saturated. For the same reason, covariances among the residuals of mediating endogenous variables ( $R_1, R_2$ , and  $R_3$ ) are not shown, unlike those of the ultimate endogenous variables ( $R_4, R_5$ , and  $R_6$ ).

## Methods

### Data

Data to test our hypotheses came from a pilot study of a longitudinal assessment of faith-based programs in Colombian prisons, including one selected for exploratory research. For this study, we administered a survey to males housed in a prison (Carcel Las Mercedes) in Montería, a city located 311 miles north-northwest of Bogotá, Colombia’s capital city. The prison had blocks (called “pabellón,” which means pavilion) of all three levels of security: minimum, medium, and maximum. While we were unable to obtain information about the prison’s population size at the time of survey administration, the prison had a total of 972 inmates (898 males and 74 females) at the time of writing this paper.

During the last week of February 2020, we were allowed to visit some medium-security blocks to ask prisoners to consider voluntarily participating in the survey, providing an informed consent form. Those who agreed to participate read and signed the consent form before completing the survey. We were able to collect 139 completed surveys but could not keep track of the number of prisoners invited to participate in our study because they were highly mobile within each housing unit, and we had no control over their movement. As a result, the survey response rate could not be calculated, and differences between survey participants and non-participants are unknown. Given this non-random nature of the sample, caution is warranted in reviewing the results. Assuming that the population size has not drastically changed since February 2020, our sample was about 15 percent ( $= 139/898 \times 100\%$ ) of the prison’s male population. Analyzing data from a non-Western country, like Colombia, enables us to examine whether religious influence on prisoners is consistent with

what has been found in the United States and other Western countries (Herzog 2003; Jang et al. 2021; Ronel and Ben Yair 2018).

## Measurement

The key exogenous variable, religiosity, was measured by three items about religious behaviors, one public and two private behaviors. Specifically, the item of public religiosity asked about the frequency of religious *service attendance*: “How often do you currently attend religious services at a place of worship?” (1 = never, 2 = less than once a year, ... 7 = about weekly, 8 = several times a week; see Appendix A for a complete list of response categories). Two items of private religiosity were about the frequency of *praying* (1 = never, 2 = only on certain occasions, ... 5 = once a day, 6 = several times a day) and *reading a sacred book* (i.e., “the Bible, Koran, Torah, or other sacred book”) outside of attending religious services (1 = never, 2 = less than once a year, ... 7 = several times a week, 8 = everyday) (see Appendix A). As expected, the three items were positively related with one another, while the private practices of praying and reading a sacred book were a bit more highly correlated with each other ( $r = .499$ ) than with religious service attendance ( $r = .404$  and  $.301$ , respectively). Given their relatively low inter-item reliability (Cronbach’s  $\alpha = .635$ ), we decided to keep the religiosity items separate, which will allow us to see any differences in their relationships with endogenous variables,<sup>1</sup> which we now turn to.

The virtue of *forgiveness* was also measured by three items, which asked how often a survey respondent had (1) forgiven himself for things he had done wrong, (2) asked for forgiveness from those whom he had hurt, and (3) forgiven those who hurt him (1 = never, 2 = seldom, 3 = sometimes, 4 = often). Exploratory factor analysis (EFA) of these items generated a single-factor solution with high loadings, ranging from  $.656$  to  $.797$  (see Appendix A), and the items had a good internal reliability ( $\alpha = .759$ ). Based on these results, we created a composite measure by averaging the items. The virtue of *self-control* was measured in terms of impulse control, using an item that was reverse-coded: “How often would you say you act on the spur of the moment without stopping to think?” (1 = always, 2 = often, 3 = sometimes, 4 = rarely, 5 = never). The measurement of *gratitude* was also based on a single item that asked how much a survey respondent agreed with a statement (“I am thankful to many different people.”) based on a 7-point Likert scale (1 = strongly disagree, 2 = disagree somewhat, ... 6 = agree, 7 = strongly agree; see Appendix A for a complete list of responses categories).

The ultimate endogenous variables of negative emotional states were operationalized in terms of the frequency of feeling angry, depressed, and anxious during one or two weeks prior to the survey. Specifically, to measure *state anger*, a survey respondent was asked how often he had felt angry during the last week (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often). *State depression* was measured in the same way, using five items of CES-Depression Scale (Radloff 1977), which EFA showed loaded on a single factor with high loadings, ranging from  $.602$  to  $.764$  and had high internal reliability ( $\alpha = .793$ ) (see Appendix A). We used Spitzer et al.’s (2006) 7-item generalized anxiety disorder scale (GAD-7) to measure *state anxiety*. EFA of the items generated a single-factor solution with moderate-to-high loadings, ranging from  $.533$  to  $.713$ , and the inter-item reliability was high ( $\alpha = .810$ ).

To control for the sociodemographic sources of spurious relationships among the above variables, we constructed measures of survey respondent’s social and demographic backgrounds. *Age* at the time of survey was calculated based on a respondent’s self-reported date of birth. To measure ethnic background, a respondent was asked in terms of which of four ethnic categories he would describe himself (1 = White and Mestizo, 2 = Afro-Colombian including Mulatto, Raizal, and Palenquero, 3 = Amerindian, 4 = other), and a dummy variable of ethnicity was created (0 = White and Mestizo, 1 = *non-White*). *Education* was measured by an interval variable (1 = no schooling, 2 = Grade 1–5, 3 = Grade 6–8, 4 = Grade 9, 5 = Grade 10, 6 = Grade 11, 7 = undergraduate or higher degree). A respondent’s current marital status was asked (1 = married, 2 = never married, 3 =

widowed, 4 = separated, 5 = divorced), and a dummy variable was created (1 = *married*, 0 = not currently married). We also asked about a respondent's current religion (1 = Protestantism, 2 = Catholicism, 3 = Islam, 4 = Hinduism, Buddhism, or other Eastern religion, 5 = Native religion, 6 = other religion, 7 = no religion), and a dummy variable was created (1 = *no religion*, 0 = currently having a religion). Given the exploratory nature of this study, no justice-related information (e.g., criminal history or sentence length) was obtained.

### **Analytic strategy**

For hypothesis testing, we applied a manifest-variable structural equation modeling (SEM) approach to analyze data from the survey. The SEM approach allowed us to not only simultaneously estimate six endogenous variables (i.e., three mediating and three ultimate endogenous variables) but also to test the significance of mediation (which would not have been possible utilizing path analysis). For model estimation, we employed Mplus 8.9 (Muthén and Muthén 2017) that incorporates Muthén's (1983) "general structural equation model" and full information maximum likelihood (FIML) estimation. As concepts were measured by categorical and ordinal as well as continuous variables, the estimation method of maximum likelihood with robust standard errors (MLR) was used.<sup>2</sup>

Next, FIML was employed to treat missing data, which tends to produce unbiased estimates like multiple imputations (Baraldi and Enders 2010; Graham 2009). Because of this missing data treatment method, the total number of observations Mplus used for model estimation was 139, while most variables had missing data as reported in the next section. Although SEM is a "large sample" method, the total sample size fell within the range of minimum sample size considered as appropriate to conduct SEM, 100 to 150 (Anderson and Gerbing 1988; Ding, Velicer, and Harlow 1995; Tinsley and Tinsley 1987). No model fit index is reported because the model is saturated. For statistical significance ( $\alpha = .05$ ), we conducted two-tailed tests but applied one-tailed test as well to the hypothesized relationships because their directions were predicted *a priori*.

Finally, in this paper we present results from estimating the manifest-variable model (shown in Figure 1) as our main findings, while we could have focused on its latent-variable version, where three endogenous variables – for which multiple items of high internal reliability were available for their measurement (i.e., forgiveness, state depression, and state anxiety) – were specified as latent factors using their multiple items as indicators. Although latent-variable modeling is superior to its manifest-variable counterpart (e.g., controlling for measurement errors in estimating a model), the decision was made for a relevant methodological reason. Specifically, the latent-variable model had more parameters to estimate (158) than the sample size (139), and, as a result, the standard errors of parameter estimates may not have been trustworthy. We make results from estimating the latent-variable model as supplemental findings, which we discuss in comparison with the main findings in the next section.

### **Results**

Table 1 shows the descriptive statistics of all variables used in our analysis, including sociodemographic characteristics of the sample. The respondents were, on average, about 41 years old with the youngest and oldest being 23 and 79, respectively. About two thirds (65.9%) of the sample were White and Mestizo in ethnicity, and the others (34.1%) self-identified as Afro-Colombian (17.1%), Amerindian (10.9%), and "other" (6.2%). The average education (3.457) fell between "Grade 6–8 (= 3)" and "Grade 9 (= 4)." A bit more than two fifths (44.2%) of survey respondents were currently "married," with the second largest group being "never married" (37.2%) and the remainder holding a postmarital status, either "separated" (14.0%), "divorced" (3.1%), or "widowed" (1.6%). Eight out of 10 (80.0%) respondents self-identified as Christian (59.2% Protestant, 20.8% Catholic) with eight percent reporting 'other religion' (including no adherent of Islam, Eastern religion, or Native religion), whereas 12 percent of the sample reported that they had no religion. Consistent with this



**Table 1.** Descriptive statistics of variables used in analysis.

Variable	<i>n/f</i>	Mean/%	S.D.	Maximum	Minimum
Age	125	40.800	11.806	23.000	79.000
Non-white	129	.341	.476	.000	1.000
Education	129	3.457	1.858	1.000	7.000
Married	129	.442	.499	.000	1.000
No religion	125	.120	.326	.000	1.000
Service attendance (SA)	127	6.709	1.839	1.000	8.000
Praying	133	5.053	1.568	1.000	7.000
Reading a sacred book	134	5.963	2.360	1.000	8.000
Forgiveness	139	3.379	.658	1.330	4.000
Self-control (SC)	134	4.172	.946	1.000	5.000
Gratitude	138	6.217	1.237	1.000	7.000
State anger	124	2.452	1.136	1.000	5.000
State depression	138	2.459	.882	1.000	5.000
State anxiety	139	2.655	.861	1.000	5.000
Ethnicity					
White and Mestizo	85	65.9%			
Afro-Colombian	22	17.1%			
Amerindian	14	10.9%			
Other	8	6.2%			
Total	129	100.0%			
Education					
No schooling	11	8.5%			
Grade 1–5	48	37.2%			
Grade 6–8	21	16.3%			
Grade 9	9	7.0%			
Grade 10	4	3.1%			
Grade 11	32	24.8%			
Undergraduate+	4	3.1%			
Total	129	100.0%			
Marital status					
Married	57	44.2%			
Never married	48	37.2%			
Widowed	2	1.6%			
Separated	18	14.0%			
Divorced	4	3.1%			
Total	129	100.0%			
Religion					
Protestantism	74	59.2%			
Catholicism	26	20.8%			
Islam	0	0.0%			
Eastern religion	0	0.0%			
Native religion	0	0.0%			
Other religion	10	8.0%			
No religion	15	12.0%			
Total	125	100.0%			

high percentage (88%) of the sample having a religious affiliation, a typical survey participant reported that he attended religious services at a place of worship almost weekly (6.709), prayed in private daily (5.053), and read a sacred book, whether the Bible or something else, about once a week (5.963) outside of religious services.

We began with estimating a model without any mediators (i.e., virtues) to establish baseline relationships between religious behaviors and negative emotional states.<sup>3</sup> The top panel of [Table 2](#) presents results from estimating the baseline model, parameter estimates (*b*) and their standard errors (*S.E.*). We found that each religious behavior was inversely related to only one of the negative emotions. Specifically, service attendance was significantly associated with state anger ( $b = -.156$ ) in the expected direction, but not with state depression ( $b = .030, p > .05$ ) or anxiety ( $b = .037, p > .05$ ), whereas praying and reading a sacred book in private were related only to state depression ( $b = -.172$ ) and anxiety ( $b = -.081$ ), respectively. Among the three relationships, the prayer-depression relationship ( $\beta = -.305$ ) was somewhat stronger than the relationship between religious service

**Table 2.** Baseline and full models of religiosity, virtues, and negative emotional states ( $n = 139$ ): Parameter estimates ( $b$ ) and standard errors ( $S.E.$ ).

Variable	Forgiveness		Self-control		Gratitude		State anger		State depression		State anxiety	
	$b$	( $S.E.$ )	$b$	( $S.E.$ )	$b$	( $S.E.$ )	$b$	( $S.E.$ )	$b$	( $S.E.$ )	$b$	( $S.E.$ )
Baseline model												
Age							-.016*	(.008)	-.017*	(.006)	-.006	(.006)
Non-white							.105	(.191)	-.057	(.138)	.305*	(.150)
Education							.009	(.065)	-.020	(.051)	-.042	(.047)
Married							-.288	(.184)	.026	(.153)	-.192	(.145)
No religion							.333	(.368)	.490*	(.241)	-.042	(.214)
Service attendance (SA)							-.156*	(.070)	.030	(.048)	.037	(.042)
Praying							.043	(.080)	-.172*	(.049)	-.025	(.052)
Reading a sacred book							-.044	(.047)	.039	(.027)	-.081*	(.034)
State anger												
State depression							.284*	(.092)				
State anxiety							.246*	(.081)	.399*	(.071)		
$R^2$							.151		.147		.125	
Full model												
Age	.012*	(.005)	.021*	(.007)	.025*	(.009)	-.003	(.008)	-.013*	(.006)	.002	(.006)
Non-white	.155	(.119)	.015	(.171)	.104	(.185)	.180	(.186)	-.033	(.135)	.324*	(.138)
Education	.053	(.032)	.127*	(.046)	-.013	(.070)	.065	(.061)	.016	(.051)	.013	(.042)
Married	.235*	(.108)	.291	(.156)	.528*	(.184)	-.046	(.186)	.099	(.148)	-.070	(.144)
No religion	-.026	(.175)	.149	(.243)	-.042	(.332)	.385	(.345)	.529*	(.234)	.012	(.200)
Service attendance (SA)	.065+	(.037)	.124*	(.048)	.080	(.050)	-.088	(.066)	.062	(.050)	.089*	(.037)
Praying	-.002	(.043)	.010	(.072)	-.030	(.107)	.048	(.066)	-.173*	(.050)	-.024	(.047)
Reading a sacred book	.045+	(.024)	-.002	(.039)	.117+	(.069)	-.008	(.046)	.042	(.030)	-.081*	(.033)
Forgiveness							-.495*	(.165)	-.140	(.112)	-.088	(.104)
Self-control (SC)	-.019	(.046)					-.340*	(.103)	-.199*	(.081)	-.378*	(.072)
Gratitude	.153*	(.064)	.113	(.085)			-.039	(.088)	.053	(.067)	.036	(.054)
State anger												
State depression							.215*	(.081)				
State anxiety							.137+	(.071)	.343*	(.062)		
$R^2$	.187		.176		.209		.293		.194		.264	
Indirect effect												
SA → SC →							-.042*	(.021)	-.025+	(.013)	-.047*	(.020)

Note. Underlined parameter estimates refer to residual covariances among endogenous variables.  
 +  $p < .05$  (one-tailed test), \*  $p < .05$  (two-tailed test).

attendance and state anger ( $\beta = -.255$ ) and that between reading a sacred book and anxiety ( $\beta = -.221$ ), respectively (standardized coefficients are not presented in the table). We also found negative emotional states to be positively associated with one another ( $b = .215, .137$ , and  $.343$ ) with the self-directed emotions of state depression and anxiety being more strongly correlated with each other ( $\beta = .611$ ) than with their other-directed counterpart, anger ( $\beta = .337$  and  $.296$ , respectively), as Agnew's general strain theory would have predicted (Agnew 2006; see also Jang and Johnson 2003).

The bottom panel of Table 2 shows the estimated full model, which includes virtues as mediators of the religiosity-negative emotional state relationship. We found two of three religious behaviors were each significantly related to two out of three virtues. Specifically, attending religious services was positively associated with forgiveness ( $b = .065$ ) and self-control ( $b = .124$ ) with the latter association ( $\beta = .244$ ) being a bit stronger than the former ( $\beta = .182$ ), whereas reading the Bible or another sacred book in private was related to forgiveness ( $b = .045, \beta = .160$ ) and, to a greater extent, gratitude ( $b = .117, \beta = .223$ ). However, praying privately was not significantly related to any of the virtues.<sup>4</sup> In sum, Hypothesis 1 received partial (44.4%) support, as four out of nine relationships (3 religious behaviors x 3 virtues) were found to be significant in the hypothesized direction.<sup>5</sup>

Hypothesis 2 also received partial (44.4%) support in that we found four out of nine relationships between three virtues and three negative emotional states were significant in the expected direction. That is, forgiveness was inversely related only to state anger ( $b = -.495$ ), and self-control was negatively associated with all three negative emotions, state anger ( $b = -.340$ ), depression ( $b = -.199$ ), and anxiety ( $b = -.378$ ) with the last association ( $\beta = -.414$ ) being stronger than the

first two ( $\beta = -.285$  and  $-.213$ , respectively). Gratitude, however, was not significantly related to any of the negative emotional states ( $b = -.039, .053, \text{ and } .036, p > .05$ ).<sup>6</sup>

We further examined whether the virtues related to both religiosity and negative emotions significantly mediated the religiosity-negative emotional state relationship, conducting statistical tests of the mediation. The test showed that self-control significantly mediated, to a varying degree, the relationship between religious service attendance and state anger, depression, and anxiety ( $b = -.042, -.025, \text{ and } -.047$ , respectively; see the bottom of table).<sup>7</sup> As a result of this mediation, the initially significant relationship between religious service attendance and state anger ( $b = -.156$ ; see the top panel) became 40.8 percent smaller ( $= - [.156 - .088] / -.156 \times 100\%$ ) and non-significant in the full model ( $b = -.088, p > .05$ ). However, the initial relationships between private religious behaviors (praying and reading a sacred book) and self-directed emotions (state depression and anxiety) did not change in size or significance ( $b = -.173$  and  $-.081$  compared to  $b = -.172$  and  $-.081$  in the baseline model) because there was no significant mediation of the relationships.

In the full model, we found significant relationships were in the expected directions with one exception: the direct relationship between religious service attendance and state anxiety was in the positive rather than negative direction ( $b = .089$ ). That is, *ceteris paribus*, prisoners who frequently attended religious services were more likely to report state anxiety than those who participated less frequently or not at all in the ritual. Closer examination revealed that the initially non-significant relationship between religious service attendance and state anxiety ( $b = .037$ ; see the top panel) turned significant when self-control was added as the only mediator to the baseline model ( $b = .083, S.E. = .039$ ; not shown in the table), though the same was not observed when either of the other virtues was added. While it is difficult to explain this anomaly, the positive relationship might indicate the possibility of reverse causation, that is, feelings of anxiety leading prisoners to attend religious services rather than vice versa.

### Supplementary analysis

We conducted two sets of supplementary analysis. First, we replaced the composite measure of forgiveness with its three constituent items in the full model to explore any differential relationships involving the different types of forgiveness: forgiving self, asking others for forgiveness, and forgiving those who hurt one in the past. Second, in both baseline and full models, we specified forgiveness, state depression, and state anxiety as latent variables, using their multiple items as indicators.

In the first alternative model (see Supplemental Table 1), we found that the positive relationship observed between religious service attendance and forgiveness ( $b = .065$ ; see the bottom panel of Table 2) was attributable equally to the public religious behavior being positively related to both forgiving self ( $b = .084, \beta = .197$ ) and those who had hurt one in the past ( $b = .087, \beta = .196$ ), but not asking others for forgiveness ( $b = .006, p > .05$ ). To the contrary, the positive relationship we found between reading a sacred book and forgiveness ( $b = .045$ ; see Table 2) was due to asking others for forgiveness ( $b = .053$ ). In addition, we found forgiveness to be inversely associated with state anger ( $b = -.495$ ; see Table 2) because two of the three types of forgiveness (forgiving self and asking others for forgiveness) had negative relationships with state anger ( $b = -.353$  and  $-.255$ , respectively).<sup>8</sup> Other relationships, including the anomalous one between religious service attendance and state anxiety ( $b = .092, \beta = .198$  compared to  $b = .089, \beta = .191$  in Table 2), generally remained the same.

Next, the latent-variable, baseline and full models were estimated (see Supplemental Table 2). Besides the  $\chi^2$  statistic, we used three types of model fit indexes to determine the degree to which the alternative models fit our data: incremental (CFI: comparative fit index), absolute (SRMR: standardized root mean squared residual), and parsimonious fit index (RMSEA: root mean square error of approximation). Specifically, both baseline and full models met one of two Hu and Bentler's (1999) joint criteria—(CFI  $\geq .950$  and SRMR  $\leq .080$ ) and (SRMR  $\leq .080$  and RMSEA  $\leq .060$ ) – with SRMR (.058

and  $.063 < .090$ ) and RMSEA (.047 and  $.045 < .060$ ) being smaller than their maximum cutoff, while both models' CFI (.909 and  $.909 < .950$ ) came short of the minimum cutoff.<sup>9</sup>

In both baseline and full models, overall results in terms of statistical significance and hypothesis testing remained similar, while the size of coefficients associated with latent variables did change. In addition, the explained variance ( $R^2$ ) of latent endogenous variables and the manifest endogenous variable that had latent variables as predictors (i.e., state anger) increased, perhaps due to controlling for measurement error. For example, in the full model, the explained variance of forgiveness became larger, from .187 (see Table 2) to .280 (see Supplemental Table 2), whereas that of state anger, depression, and anxiety, increased from .293, .194, and .264 to .325, .264, and .318 (11.2%, 36.1%, and 20.4% respectively).

## Discussion

Since religious involvement tends to enhance mental health among people in the general population (Koenig, King, and Carson 2012; Levin 2010), we expected a similar pattern among those in the stressful environment of a prison population. Despite their wrongdoing, incarcerated individuals are as much human as their peers outside of correctional facilities. Additionally, religious prisoners report lower levels of negative emotions than their less or not religious counterparts (Clear and Sumter 2002; Jang et al. 2021). The current study was intended to contribute to the criminal justice literature on religion and mental health by addressing an understudied issue: why involvement in religion is likely to enhance emotional well-being among incarcerated individuals. To do so, we examined the “virtuous effect” of religion on mental health (Jang et al. 2018)—i.e., religious involvement fosters virtues that enhance emotional well-being – among prisoners, hypothesizing that prisoner religiosity would be positively associated with virtues, which in turn would be inversely related to negative emotions. To test this hypothesis, we applied structural equation modeling to analyze survey data collected from a convenience sample of 139 males housed at a Colombian prison.

Consistent with previous studies (Clear and Sumter 2002; Eytan 2011; Jang et al. 2018, 2021), prisoner religiosity was inversely related to negative emotional states: that is, the public religious behavior of service attendance was negatively associated with state anger, whereas the private practices of prayer and reading a sacred book were related to state depression and anxiety, respectively, in the expected direction. More importantly, as hypothesized, we found that attending religious services and reading a sacred book in private – though not praying privately – were positively associated with the virtues of forgiveness, self-control, and gratitude, the first two of which were in turn inversely related to negative emotional states. Specifically, forgiveness was negatively associated with state anger, whereas self-control was inversely related to all three negative emotional states. A further test revealed that the inverse relationships between religious service attendance and all three negative emotional states were all significantly mediated by self-control. This finding implies that attending religious services may reduce negative emotions as a result of public religiosity fostering self-control, which may satisfy a prisoner's innate need to be virtuous (Ryan and Deci 2001; VanderWeele 2017).<sup>10</sup> Supplemental analysis showed the overall relationships remained the same when forgiveness, state depression, and state anxiety were specified as latent variables.

In the baseline model, we found differential relationships between religious behaviors and negative emotional states: that is, attending religious services was inversely related only to state anger, whereas praying and reading a sacred book in private were associated only with state depression and anxiety, respectively, in the expected direction. Although we cannot fully explain the observed differences without additional data, it is interesting to see that *public* religious behavior was significantly related to the *other-directed* emotion (i.e., anger), but not the *self-directed* ones (i.e., depression and anxiety), and that *private* religious behaviors were related only to the *self-directed* emotions. A possible explanation for this finding is that public religiosity involves interactions with

other people – a common by-product of attending religious services or other group activities (e.g., small group Bible study or prayer meetings). These communities may naturally help individuals cope with negative emotions towards other people more than those towards oneself, whereas private religious behaviors are more likely to help individuals deal with internalized rather than externalized emotions. These findings are a reminder that it is important to examine different aspects of religiosity, both public and private, in studying religion and emotional well-being among incarcerated individuals and the general population.

In the full model, the initially significant, baseline relationship between religious service attendance and state anger was fully explained (i.e., becoming non-significant) by self-control, which significantly mediated the relationship. However, baseline relationships between private religious behaviors and self-directed emotions remained the same in size and significance. This failed explanation may be due in part to our limited measurement of virtues. That is, we relied on a single-item measure of self-control (i.e., impulse control) and gratitude, which had been found to be significantly related to both religiosity and self-directed emotions in the expected directions when they were measured by multiple items (e.g., Jang and Johnson 2022; Jang et al. 2018). In addition, we had no measure of other explanatory factors than virtues that were likely to be generated by religiosity and more relevant to self-directed than other-directed emotions. For example, Jang et al. (2018; 2022) found that religiosity was positively associated with perceived presence of meaning and purpose in life, which was in turn inversely related to state depression and anxiety among prisoners. Similarly, a sense of personal control based on religious faith may also address the feelings of depression and anxiety (Mirowsky and Ross 2017).

Despite being measured by a single item, we found self-control was significantly related to all three negative emotional states, both other-directed and self-directed, whereas the other virtues were associated with only one or none of the three. This pattern has been observed in other studies (Jang and Johnson 2022; Jang et al. 2021; Jang, Johnson, and Anderson 2022) and may have a practical implication: that is, the centrality of self-control (compared to other virtues) in rehabilitating offenders and enhancing emotional well-being as well behaving virtuously. Such emphasis would be consistent with Gottfredson & Hirschi's (1990) focus on low self-control as the key cause of crime and deviance. The importance of self-control relative to other virtues in reforming offenders is a potentially fruitful topic for future research.

A key assumption of this study was that offenders, like non-offenders, are moral beings in that they have moral agency and thus understand morality (i.e., rightness, goodness, worthiness, and justice) and are capable of becoming virtuous, regardless of past deleterious choices (Howard 2017; Smith 2003). Therefore, these findings provide evidence that moral reform is a viable alternative to approaches that focus primarily on retribution or incapacitation (Braithwaite 1989; Hoskins 2013).

Cullen et al. (2014, p. 74) made the same assumption about offenders when they proposed "the virtuous prison" in order to restore the moral purpose of American corrections by using "offenders' time of incarceration to cultivate moral awareness and the capacity to act virtuously." To achieve the moral purpose, Cullen et al. (p. 76) argued, "The goal of prison organization would be to create a 'virtuous milieu' . . . to surround inmates with positive moral influences." One of their propositions for the virtuous prison was to "encourage as many upstanding community people as possible, including those religiously inspired, to lead and/or participate in prison programs, to mentor inmates, and to visit and socialize with inmates" (p. 77). In fact, even without such encouragement, many religiously inspired community people have already volunteered to do each of the things proposed by Cullen et al.

For example, a group of local volunteers in Virginia served as facilitators of a faith-based, trauma healing program for jail inmates, who have significantly higher rates of mental health problems but are neglected for treatment relative to those incarcerated individuals in prisons (Bronson and Berzofsky 2017; James and Glaze 2006). A quasi-experimental study showed that the volunteer-led program increased religiosity among participants which in turn fostered the virtues of forgiveness (of a person who caused a traumatic event to the participant) and gratitude to God, which decreased

symptoms of PTSD and suicidal ideation, respectively, between pretest and posttest (Jang et al. 2022). A religiosity-developed sense of God's forgiveness also significantly reduced state depression. Furthermore, the impact of the short-term program was found to be not short-lived, being detected three months after the program. Faith-based programs in correctional facilities tend to be privately funded as well as operated by volunteers and tend to receive empirical support for their effectiveness (e.g., Hallett et al. 2017; Jang and Johnson 2022; Jang, Johnson, and Anderson 2022; Johnson, Hallett, and Jang 2022).

While the present study provides empirical evidence of the virtuous effect of religion on mental health among prisoners, we need to acknowledge its key methodological limitations. Given that our study was based on cross-sectional data collected from a rather small, non-random sample of males in a Colombian prison, we highlight three limitations: causality, statistical power, and generalizability. In addition, since we could not control for prisoner's justice-related factors (e.g., criminal history and sentence length) and had to rely on a single-item measure for some of key variables, it is necessary to discuss data-related limitations.

First, because the cross-sectionality did not allow us to establish temporal order between independent and dependent variables, no causal inference of reported relationships is warranted.<sup>11</sup> The test of causation among the three concepts requires longitudinal data. Second, although our sample was minimally acceptable in size to conduct SEM, its relatively small size may have limited our statistical power. To retrospectively examine whether the small sample size was sufficient to reliably detect the significance of hypothesized relationships, we conducted post hoc power analysis, using Monte Carlo simulation. Overall results indicated that the parameter and their standard errors were generally well estimated with their biases being mostly within acceptable boundaries and remained stable across three simulation studies using a large number of replications (10,000).<sup>12</sup> Third, being based on non-representative data, the present findings are not generalizable, whether in terms of study population, gender, or nationality. Fourth, a lack of statistical control for justice-related factors might have resulted in over- or underestimation of hypothesized relationships. For example, sentence length may be positively related to depressive feelings, whereas religiosity tends to be related inversely to state depression among prisoners. If sentence length and religiosity were positively associated, say, as a result of opportunity factor (i.e., the longer the sentence, the greater chance to be exposed to religion in prison), not including sentence length in the model might have resulted in underestimation of the effect of religiosity on depression. If sentence length and religiosity were inversely related due to prisoner's anger toward God, then the religious effect might have been overestimated. Fifth, using a single item to measure a multidimensional construct, like self-control, may have contributed to an underestimate of the construct's effect.

Furthermore, because of the small sample size and a limited number of items available to measure some variables, we had to rely upon manifest-variable structural equation modeling for hypothesis testing, and we could only compare results from estimating a manifest-variable model with those from a limited latent-variable model for consistency. In sum, this study provides preliminary evidence of relationships among religiosity, virtues, and negative emotions among incarcerated individuals.<sup>13</sup> Future research needs to replicate the present study, using large-sample data that would enable latent-variable modeling.

In conclusion, despite these limitations, our study contributes to the criminal justice literature by adding preliminary yet positive evidence of the virtuous effect of religion on mental health among incarcerated individuals. That is, prisoner involvement in religion, both public (religious service attendance) and private (praying and reading a sacred book), was positively associated with virtues (forgiveness, self-control, and gratitude), which in turn were inversely related to negative emotional states, both other-directed (anger) and self-directed (depression and anxiety), among male prisoners in Colombia. The present results, consistent with previous findings, are worthy of attention from prison authorities who need to decide how they should support prisoners exercising their constitutional right to religion and whether they would work with local volunteers and faith-based programs

as it becomes increasingly difficult to make rehabilitation programs available to incarcerated individuals due to ever-tightening correctional budgets.

## Notes

1. One possible reason is a selection effect given that public religiosity may reflect, to some extent, extrinsic religiosity (i.e., participation in religious activities that serves other ultimate ends than religious conviction per se, such as access to local volunteers and snacks, exemption from daily chores, or protection from a potential danger from other inmates) compared to private religiosity, which is more likely to indicate intrinsic religiosity. As a result, we may find more empirical support for hypothesized relationships involving praying and reading a sacred book than service attendance.
2. Because our endogenous variables were ordinal variables, it was necessary to apply an estimation method specifically designed for categorical variables (Distefano & Finney, 2013). While a robust weighted least squares (WLS) – implemented as weighted least squares mean and variance adjusted (WLSMV) in Mplus – was an option, we chose the estimator of maximum likelihood (ML) with robust standard errors (called MLR in Mplus) because this robust ML was found to be better than the WLSMV method in terms of error-free convergence rates and estimating variance parameters and their standard errors (Bandalos, 2014; Newsom & Smith, 2020). Furthermore, MLR allows missing data with categorical variables to be better handled with FIML compared to the WLSMV method that uses a pairwise deletion (Muthén et al., 1997; Asparouhov & Muthén, 2010).
3. We examined correlations among variables to see whether there was any indication of collinearity problem. We found no such indication with the largest correlation being .575 between state depression and anxiety. The measures of religiosity were not correlated higher than .500: specifically, service attendance was correlated with praying and reading a sacred book at .405 and .311, respectively, whereas correlation between the measures of private religiosity was .495 (complete results are available upon request).
4. A supplemental analysis showed that praying privately was not significantly related to any of the virtues even when it was included without religious service attendance and reading a sacred book in the model.
5. While the virtues were expected to be positively associated with one another, we found that only forgiveness and gratitude were correlated in the expected direction ( $\beta = .236$ ), and self-control was not related to either of them ( $\beta = -.038$  and  $.120$ ,  $p > .05$ , respectively).
6. When gratitude was included with no other virtues in the model, it was found to be inversely related only to state anger ( $b = -.140$ ,  $S.E. = .080$ ,  $p < .05$ , one-tailed test; not shown in the table). This may indicate the gratitude-anger relationship is indirect via either forgiveness or self-control, which was significantly related to state anger. For example, the more grateful, the more forgiving or self-controlled, and the less likely to feel angry. In addition, after virtues were added to the baseline model, the negative emotional states remained significant in their relationships, though their size somewhat reduced ( $\beta = .289$ ,  $.197$ , and  $.589$  compared to  $\beta = .337$ ,  $.296$ , and  $.611$ ).
7. Although religious service attendance and reading a sacred book were positively associated with forgiveness ( $b = .065$  and  $.045$ , respectively), which was in turn inversely related to state anger ( $b = -.495$ ), the mediation of forgiveness was only marginally significant ( $b = -.032$  and  $-.022$ ,  $S.E. = .022$  and  $.015$ , respectively, both  $p < .10$ , one-tailed test; not presented in the table).
8. The three types of forgiveness were positively associated with one another. That is, survey respondents who forgave themselves for what they had done wrong were more likely to ask for forgiveness from those whom they had hurt and to forgive those who hurt them ( $\beta = .445$  and  $.456$ , respectively; see underlined coefficients in Supplemental Table 1). Forgiving others who hurt them and asking others to forgive them were also positively related ( $\beta = .534$ ).
9. The  $\chi^2$  statistic of baseline (186.685,  $d.f. = 143$ ,  $p < .05$ ) and full models (281.279,  $d.f. = 219$ ,  $p < .05$ ) were both significant despite the relatively small sample size.
10. In addition, our finding public religiosity to be significantly related to negative emotional states via self-control, unlike private religiosity, implies that the possibility of service attendance reflecting extrinsic religiosity (i.e., a selection bias) was minimal (see note 1).
11. Having said that, although the items of negative emotions were “previous measures” (i.e., emotional states during the last one or two weeks prior to the survey) and those of religiosity and virtues were “current measures” (i.e., religious behaviors and traits at the time of survey), estimated relationships among the three are practically concurrent given that the religiosity and virtue items were likely to measure behaviors and traits “during the last one or two weeks prior to the survey” as well as at the very moment of survey administration. To the extent that this reasoning is valid, the trivariate relationships could be causally interpreted based on theories and prior research. For example, interpreting the religiosity-virtue relationship as religiosity fostering virtue seems more plausible than virtue leading to religiosity given that virtuous people are not necessarily religious. Relationships between virtues and negative emotional states

are also more likely to indicate virtuous *traits* reducing negative emotional *states* rather than vice versa, while the religiosity-negative emotional state relationship is likely to be reciprocal as it may reflect psychological distress weakening religious behaviors as well as religiosity reducing negative emotional states.

12. Results from one of the three Monte Carlo studies are summarized in Supplemental Table 3. The first column gives parameter estimates presented in the bottom panel of Table 2, which were used as population parameter, whereas the next three columns show the average of the parameter estimates, the standard deviation of the parameter estimates, and the average of the estimated standard errors across the replications of the Monte Carlo studies, respectively. The “M.S.E.” column presents the mean square error for each parameter, and the column labeled “95% Cover” gives the proportion of replications for which the 95% confidence interval contains the population parameter value. An estimate of observed power is reported in the “% Sig Coeff” column, which shows the proportion of replications for which the null hypothesis that a parameter is equal to zero is rejected for each parameter at the .05 level (two-tailed test). The next two columns show the percentage of parameter and standard error biases, whereas the last four columns report the mean and standard deviation of “95% Cover” and “% Sig Coeff” values from the simulation studies with small standard deviations indicating the stability of results across the simulation studies. We found that the parameter and, to a lesser extent, standard error biases tended to not exceed the maximum percentage used to determine sample size in power analysis for prospective studies (10% and 5%, respectively) and that all the coverage (95% Cover) remained between .91 and .98 (Muthén, L. K. & Muthén, 2002). While these conditions were satisfied, the post hoc power of significant coefficients varied from .427 to .998, whereas that of non-significant coefficients ranged from .064 to .426, showing a functional relationship between *p*-value and observed power (i.e., the observed significance level of a test determining the observed power). Given this one-to-one relationship between *p*-value and observed power, some scholars argue that post hoc power analysis does not provide any new information or is even “fundamental flawed” (Hoenig & Heisey, 2001:19; Quach et al., 2022). Regardless, while not all the significant coefficients were observed to have power greater than a commonly accepted value for sufficient power (.800), overall results confirmed a suspicion that the non-significance of at least some coefficients might have been in part due to our small sample, implying a need for replication of the present study using a larger sample.
13. Despite the lack of applicability beyond the present sample, our hypotheses generally received empirical support, consistent with previous studies using different samples.

## Acknowledgements

The authors are grateful to: Prison Fellowship International and its administration and staff (including Mr. David Van Patten and Ms. Rae Wood); Prison Fellowship Colombia (Confraternidad Carcelaria de Colombia) and its administration and staff (including Mr. Lácides Hernandez and Mr. Joshua Ramirez); the administration and staff at the Montería Prison (Carcel Las Mercedes) in Colombia; all of the volunteers who made this study possible (including Dr. Michael Joseph); and all participants in this study.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

This work was supported by the Prison Fellowship International.

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## Appendix A. Variables Used in Analysis

Survey item (Response categories)	Loading (a)
<b>Religiosity</b>	
How often do you currently attend religious services at a place of worship? (1 = never, 2 = less than once a year, 3 = once or twice a year, 4 = several times a year, 5 = once a month, 6 = 2–3 times a month, 7 = about weekly, 8 = several times a week)	
About how often do you currently pray outside of religious services? (1 = never, 2 = only on certain occasions, 3 = once a week or less, 4 = a few times a week, 5 = once a day, 6 = several times a day)	
Outside of attending religious services, about how often do you currently spend private time reading the Bible, Koran, Torah, or other sacred book? (1 = never, 2 = less than once a year, 3 = one to several times a year, 4 = once a month, 5 = 2–3 times a month, 6 = about weekly, 7 = several times a week, 8 = everyday)	
<b>Forgiveness</b>	
Please indicate how often you have done each of the following. (1 = never, 2 = seldom, 3 = sometimes, 4 = often)	(.759)
1. To forgive myself for things I have done wrong.	.696
2. To ask for forgiveness from those whom I have hurt	.656
3. To forgive those who hurt me	.797
<b>Self-control</b>	
How often would you say you act on the spur of the moment without stopping to think? (1 = always, 2 = often, 3 = sometimes, 4 = rarely, 5 = never)	
<b>Gratitude</b>	
Please indicate how much you agree with the following statement, using the scale below. (1 = strongly disagree, 2 = disagree somewhat, 3 = slightly disagree, 4 = neutral, 5 = slightly agree, 6 = agree, 7 = strongly agree)	
• I am thankful to many different people.	
<b>During the past week</b> , how often have you experienced each of the following? (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often)	
<b>State anger</b>	
• I felt angry.	
<b>State depression</b>	
1. I felt depressed.	(.793)
2. I did not feel like eating, and my appetite was poor.	.602
3. My sleep was restless.	.607
4. I could not get going.	.643
5. I felt sad.	.705
<b>State anxiety</b>	
Over the last 2 weeks, how often have you been bothered by the following problems? (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often)	(.810)
1. Feeling nervous, anxious	.533
2. Not being able to stop or control worrying	.569
3. Trouble relaxing	.569
4. Being so restless that it's hard to sit still	.636
5. Worrying too much about different things	.680
6. Becoming easily annoyed or irritable	.713
7. Feeling afraid as if something awful might happen	.543
	.628