



Conviction, character and coping: religiosity and personality are both uniquely associated with optimism and positive reappraising

James B. Schuurmans-Stekhoven 

School of Psychology, Charles Sturt University, Bathurst, Australia

ABSTRACT

Optimism and positive reappraising seemingly mediate religiosity's association with well-being. Yet past studies linking religiosity and cognitive coping typically use a bivariate design; thereby ignoring rival explanations. Given previous evidence that agreeableness and conscientiousness (personality traits that co-vary with optimism, positive reappraisal usage and religiosity) largely nullify the association between religiosity and social support, hierarchical regression modelling of cross-sectional survey data – Australia ($N = 195$), Japan ($N = 931$) and the USA ($N = 5999$) – is employed to incrementally validate religiosity's association with optimism and also positive reappraisals. Although religiosity remains a statistically significant predictor of these coping styles, including agreeableness and conscientiousness typically reduces the strength of association. These cross-cultural results lend weight to the hypothesis that religiosity is a potential, albeit small, influence on cognitive coping styles. Prospective research is now needed to establish whether changes in religiosity precede changes in coping as theorised.

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Introduction

God in his heaven; all's right in the world! – *That's* the real heart of your theology.

James (1907, p. 122, *original emphasis*)

Theorists suggest that sanguine cognitions (i.e., positively-hued thoughts and beliefs that promote equanimity and ameliorate distress) mediate religiosity's association with well-being. For example, when caring for ill partners, the religious disproportionately utilised positive reappraisals to cope – thereby boosting positive affectivity (Folkman, 1997). Moreover, in community samples, optimism (Salsman, Brown, Brechting, & Carlson, 2005) and positive emotions (Van Cappellen, Toth-Gauthier, Saroglou, & Fredrickson, 2016) are mediators between religiosity and life satisfaction.

Yet, because positive thinking is also determined by a wide array of biopsychosocial factors other than religiosity, interpreting faith's contribution to sanguine cognitive tendencies remains thorny. Furthermore, although religiosity may aid sanguinity, de-conversion can also trigger positive thoughts and emotions (Buxant & Saroglou, 2008).

CONTACT James B. Schuurmans-Stekhoven  jschuurmans-stekhoven@csu.edu.au

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Consequently, bivariate demonstrations of the religiosity-positivity association are inescapably simplistic; multivariate verifications are required. Schuurmans-Stekhoven's (2011, 2017) findings that simple religiosity effects are annulled by the inclusion of rival secular predictors further highlights the need for multivariate investigations.

Besides religiosity, personality traits also seem to influence the affective hue of cognitions. In particular, agreeableness and conscientiousness – dispositions that co-vary with religiosity (Saroglou, 2002, 2010) – are known to predict positively-framed deliberations both before (Bastianello, Pacico, & Hutz, 2014) and after (Gross & John, 2003) the fact. Remarkably however, an extensive database search failed to unearth any research establishing the incremental validity of the association between faith and coping styles that statistically controls for personality. I aim to fill this knowledge gap.

Do sanguine cognitions mediate religiosity's association with adaptive functioning?

Hoping to explain how faith facilitates adaptive functioning, prior research has tested numerous potential mediators. Several theorists, after observing how faith-based teachings routinely encourage positive cognitive–affective states (e.g., acceptance, hope, etc.), suggest that such faith-inspired cognitions might be a key explanatory mechanism for the salutary psychological and physical health effects associated with religiosity (Ciarrocchi, Dy-Liacco, & Deneke, 2008; DeAngelis & Ellison, 2017; Koenig et al., 2014; Park, 2013; Salsman et al., 2005; Van Cappellen et al., 2016; Vishkin et al., 2016).

Are sanguine cognitions salutary?

Optimism and adaptive functioning: Accumulating evidence indicates that optimism (i.e., a chronic tendency to expect future self-relevant prosperity) is observed globally (Fischer & Chalmers, 2008) and predicts healthy functioning (Carver & Scheier, 2014) and behavioural adjustment following a cancer diagnosis (Harper et al., 2007). This positive cognitive stance also predicts mental health (Conversano et al., 2010), improved immunity when stressed (Segerstrom & Sephton, 2010), and adaptive coping styles (Rasmussen, Wrosch, Scheier, & Carver, 2006) – including information-seeking, positive reframing (Carver et al., 1993), and using humour and acceptance (Scheier, Carver, & Bridges, 2001). Optimism's association with adaptive functioning is also observed cross-culturally (Ramsay et al., 2015).

Some attribute the adaptive effects of optimism to self-composure and motivation; relative to pessimists, optimists report feeling more certainty and pursue goals more doggedly (Carver, Scheier, & Segerstrom, 2010). Interestingly, optimism's benefits accrue even when such positive expectancies are unrealistic; i.e., even when optimists over-estimate their abilities and downplay the situational risks (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000).

Another hypothesised, albeit indirect, path from optimism to well-being is via social support enhancement as the quantity and quality of optimists' social ties tend to exceed those of pessimists (Carver & Scheier, 2014). Compared to pessimists, optimists are more inclined to seek-out social affiliates when distressed (Scheier, Carver, & Bridges, 2001) and they generally garner more support; in part because they invest more in maintaining relationships (Karademas, 2006). Thus the positive association observed between faith and social support (Schuurmans-Stekhoven, 2017) might partly arise because the religious tend to be more optimistic. Noteworthy in this context,

Salsman et al. (2005) found that both optimism and social support mediate the religiosity-life satisfaction link; though they did not report a multiple or a serial path model.

Positive reappraisal and adaptive functioning: Somewhat akin to optimism, afterthoughts that involve positively reappraising past events – i.e., post-event analyses that diminish the net perceived cost/threat or amplify the pleasant and beneficial aspects of earlier experiences – have been shown to improve mood and psychological well-being in general samples (Gross & John, 2003), among caregivers (Folkman, 1997) and among the traumatised (Joseph, Murphy, & Regel, 2012). In part, such reframing appears to reduce the psychological impact of negative life events by increasing the frequency of positive cognitive–affective states (e.g., coherence, equanimity, courage, hope, etc.). Whether such reappraisals also allay negative affectivity is unclear (Shiota, 2006).

Although Shiota (2006) reports that physical symptoms and pain reduce our propensity to spontaneously employ positive reappraisals, Garland, Gaylord, and Fredrickson (2011) found that among pain-sufferers, those who positively reframe, disproportionately used newly-learned meditation techniques to alleviate their discomfort. Moreover, positively reappraising past events also mediates the health outcomes derived from social-support (Schroevers, Hegelson, Sandaman, & Ranchor, 2010) and among the severely mentally ill, fully mediates the link between social support and reduced functional impairment (Davis & Brekke, 2014). However, as life traumas accumulate, the frequency with which people spontaneously use positive reappraisals decreases (DeAngelis & Ellison, 2017).

Religiosity/spirituality and sanguine cognitions

It seems self-evident that religious/spiritual instruction – from either established faith-traditions or New Age systems – encourages both positive future expectancies (e.g., assurances of a blissful afterlife) and positive reappraising of negative life events (e.g., interpreting tribulations as part of a Higher purpose). On inspection, personal faith in some unseen realm – one that includes benevolent and intervening supernatural agents – and sanguine cognitions such as hope and optimism share many features in common. A willingness and a capacity to suspend disbelief/doubt and a personal belief that one possesses (or can readily access) the skills and resources needed to achieve desired goals are hallmarks of each. Religious/spiritual beliefs – especially belief in (i) a guiding and intervening Divinity (DeAngelis & Ellison, 2017), (ii) a spiritually-ordained life purpose/path (Park, 2013), (iii) theological cannons that enhance one’s subjective sense of certainty (Hogg, Adelman, & Blagg, 2010), (iv) an afterlife where one’s soul will be protected (Ghayas & Batool, 2016), (v) karmic justice in the here-and-now (Lai, 2015), and (vi) creeds shared with likeminded associates who offer psychological and practical support (Hayward & Elliott, 2009) – seem to be socio-cultural mechanisms for predisposing adherents to form positive / self-soothing cognitive representations of the life-events that happen to befall them (DeAngelis & Ellison, 2017; Vishkin et al., 2016). Hence, it seems reasonable to view self-assured optimism and a tendency to positively re-evaluate events as likely by-products from believing in an authoritative and benevolent Higher power (all other things being equal). Of course, the pragmatist James (1907), like Baron d’Holbach (Thiry, 1770/2000) before him, recognised that a propensity for sanguine cognitions is amplified by faith.

Positioning religiosity as a sociocultural conduit that shapes cognitive–affective processing (i.e., ties religious paraphernalia/rites to positive affectivity) suggests that regular

faith-related practice could instil a top-down positivity bias. Repetitious activation, encoding and retrieval of religious/spiritual teachings and practices that reference a benevolent Divinity, and/or a blissful afterlife is likely to facilitate positive fore- and after-thoughts via standard mood-congruent and mood-maintenance mechanisms (Bower, 1981). Similarly, *Affect-Valuation Theory* (AVT; Tsai, Koopman-Holm, Miyazaki, & Ochs, 2013) posits that affiliating with congregants alters one's demeanour. AVT suggests that exposure to in-group affectivity norms acculturates individuals to mimic these states via social identification processes. From this perspective, religious and/or spiritual socialisation offers believers a template for emulating the feelings and the positively-hued cognitions of prototypic congregants and clergy. That virtually every major religion instructs its followers to pursue low-arousal positive mood states (e.g., contentment, compassion, hope, kindness, etc.) and to eschew negative affective states (Kay, Gaucher, McGregor, & Nash, 2010) concurs with the hypothesis that, regardless of the specific faith, devotees will tend to develop a positive outlook.

Religiosity/spirituality and optimism

Unsurprisingly, given the aforementioned, religiosity/spirituality predicts optimism in the general community (Ciarrocchi et al., 2008; Salsman et al., 2005) and among the ill (Koenig et al., 2014). Focusing on the effectiveness of psychotherapy for the religious, Koenig, Pearce, Nelson, & Daher (2015) report that, religiously/spiritually augmented cognitive-behavioural treatment (CBT) disproportionately elevates optimism (compared to standard CBT). Interestingly spiritual doubt – measured as scepticism over the (i) veracity of religious teachings, (ii) the potency of prayer, and (iii) religious scriptures having practical solutions for daily life – among the religious prospectively predicts life dissatisfaction and pessimism (Krause, 2006). Moreover, faith and optimism are both positively-hued pre-factual cognitions and both align somewhat with the notion of *positive illusions* (Taylor et al., 2000). Yet, despite their conceptual overlap, faith and optimism also differ. For example, religiosity, but not optimism, necessarily involves social membership and references to self-transcendent, unseen forces and the existence of a sacred immaterial realm.

Religiosity/spirituality and positive reappraisal

Echoing Freud (1927/2004) – who conceptualised religion as an antidote for existential angst – DeAngelis and Ellison (2017) view faith as a transcendental framework that encourages devotees to reappraise uncontrollable and intractable negative events as a part of a Divine plan. They report that belief in Divine control prospectively predicts a propensity to use positive reappraisals following loss. Similarly, Hanley, Garland, and Black (2014) found that contemplative religious practices (e.g., prayer and meditation) predict a proclivity for positive cognitive reappraising. Furthermore, in an HIV-positive sample, faith-status predicted a tendency to utilise positive reappraising that, in turn, lowered depressive symptoms (Carrico et al., 2006; see also Folkman, 1997).

Summary

A growing literature indicates that religiosity/spirituality is associated with a tendency toward sanguine cognitions. Yet most prior studies employ small samples from circumscribed sub-populations and omit rival explanations. The latter is an important oversight since faith is not the only mechanism for fostering rosy fore- and after-thoughts (Ai,

Peterson, Tice, Bolling, & Koenig, 2004). Thus, whether these associations prevail in community samples after covariate effects are removed remains to be established.

Personality traits that co-vary with religiosity also predict sanguine cognitions

Agreeableness, conscientiousness and religiosity/spirituality

Although comparisons of the personality profiles of religious versus secular people have consistently found agreeableness and conscientiousness to be elevated among believers (Saroglou, 2002, 2010; Schuurmans-Stekhoven, 2014), a more nuanced description indicates that most non-believers are not slovenly misanthropes (Schuurmans-Stekhoven, 2011). Since these two traits are in part biologically-determined (Bergeman et al., 1993) and are shaped by group dynamics (Sapolsky & Share, 2004), there are grounds for suspecting agreeableness and conscientiousness traits may explain, at least partly, the sanguine cognitions that many currently attribute to religiosity.

Agreeableness, conscientiousness and sanguine cognitions

According to the HEXACO model (Ashton & Lee, 2007) trait agreeableness reflects an individual's prototypic interpersonal style. Agreeable individuals, being tolerant, modest and forgiving are predisposed to approach others in a positive manner. That is, agreeable people take a benevolent and constructive view of social interactions; including *faux pas* and insults by others. Such an interpersonal style exhibits an optimism that collectivism and communalism are ultimately beneficial to all. Similarly conscientiousness – i.e., being habitually goal-oriented, meticulous, organised and diligent – also reflects a positive outlook. Ashton and Lee (2007) argue that conscientious individuals possess a chronic willingness to invest effort; envisaging strategies and enacting planned projects that aim to maximise their own future well-being. In other words, conscientious types resist immediate gratification and distraction with the optimism that they will later reap a greater outcome (Judge & Ilies, 2002; Komaraju, Karau, & Schmeck, 2009). Such acts reflect sanguine cognitions in two important ways; conscientious people are confident that their agentic efforts will eventually pay-off, and that they themselves will survive to reap these delayed returns in future.

Indeed agreeableness and conscientiousness predict optimism ($.25 < r < .48$; Bastianello et al., 2014; Marshall, Wortman, Vickers, Kusalas, & Hervig 1994; Sharpe et al., 2011). Most compellingly, Sharpe et al. show that these two particular traits predict optimism ($.10 < \beta < .46$) even after controlling for participants' co-occurring differences in extraversion and neuroticism. However, Marshall et al. (1994) report that conscientiousness, but not agreeableness, incrementally contributes to optimism after removing extraversion and neuroticism effects.

In a similar vein, conscientiousness and agreeableness are also known to be associated with both positive reappraisal and acceptance (Connor-Smith & Flachsbart, 2007; Gross & John 2003). On reflection, given that conscientiousness predicts goal-setting and achievement (Judge & Ilies, 2002) and, together with agreeableness, greater social support (Schuurmans-Stekhoven, 2017), both of these traits are probably associated with increased odds of obtaining desired life outcomes. Consequently, given their achievements, individuals displaying these traits may be disproportionately sanguine despite the occasional setback.

Arguing that general personality traits (i.e., characteristics that even atheists can exhibit) may be better explanations for sanguine cognitions than faith, Schuurmans-Stekhoven (2017) found that agreeableness and conscientiousness nullify the correlation between faith and social support (and even explained additional variance that faith failed to capture). This result thus raises doubt over religiosity's incremental validity more generally; perhaps the reported association between religiosity and coping styles is similarly spurious? The current paper thus statistically tests the cross-sectional association between religiosity and two outcome measures (optimism; and positive reappraisals) while the effects due to agreeableness and conscientiousness are contemporaneously controlled. It is anticipated that all three predictors – religiosity/spirituality, agreeableness and conscientiousness – will be positively interrelated and will each independently explain variation in optimism and positive reappraisal coping tendencies.

Method

Design overview

Cross-sectional surveys from three different cultures were utilised to gather data on the variables of interest. Study 1 is a relatively small online Australian sample recruited via social network snowballing. Given the results seen using this data, cross-validation using pre-collected large archival datasets sponsored by the National Institute on Aging – The *Midlife Development from Japan* (MIDJA; Study 2) and also the *US* (MIDUS I; Study 3) – was undertaken. The latter two samples were randomly selected from the respective populations (i.e., used random-digit-dialling). Of particular note, each of these surveys uses different instruments to measure religiosity, agreeableness and conscientiousness. Therefore each sample was analysed separately.

Study 1: Australian online sample

Participants and sampling

Participants ($N = 195$) were recruited online utilising *SurveyMonkey*TM, May – October 2017. The survey was posted on social media (e.g., *Facebook*TM) with all those who visited the study information page asked to post the study hyperlink to their own social media site (even if they did not participate).

Instruments and measures

Religiosity/Spirituality: The six-item *CSI-Spirituality* (Schuurmans-Stekhoven, 2014) measure of personal supernatural belief and practice was employed. This scale contains items such as “I believe in a universal power/God” and “I believe that each person has a soul”. A five-point anchored response options (1=“strongly disagree” to 5=“strongly agree”) is used for each item.

Optimism: The *Life Orientation Test-Revised* (LOT-R; Scheier, Carver, & Bridges, 1994) was utilised to measure positive expectancy. LOT-R has six items (three reversed) plus fillers with a four-point anchored Likert response options (1=“disagree a lot” to 4=“agree a lot”) per item. No items refer to religion or any other numinous concepts.

Personality traits: The Brief IPIP Measures of Agreeableness and Conscientiousness were employed (Goldberg et al., 2006). These scales are reliable and display convergent validity. A five-point anchored response options (1="strongly disagree" to 5="strongly agree") is used for each item.

Study 2: Japanese community sample

Participants and sampling

Data gathered via the *Survey of Midlife Development in Japan* (MIDJA, ICPSR 30822; Ryff et al., 2018) was utilised to see if the Study 1 findings would replicate. Adults of at least 30 years of age from Tokyo, Japan were probability sampled. A largely gender-balanced (50.6% female) of 931 completed all the items of interest.

Instruments and measures

Religiosity: A six-item questionnaire (which used an anchored four-point Likert-type response scale) included questions on "How religious are you?", "To what extent do you believe in God/Buddha?" "Do you pray/worship at a home altar?" This measure was selected in preference to religious affiliation because many Japanese hold syncretic and inclusive religious beliefs that draw from several distinct faith traditions (Josephson, 2012). The first three items ("How religious are you?" "Is religion important in your life?" and "To what extent believe in god/Buddha") use "not at all" and "very" as anchors. The last three items ("Do you pray/worship at home altar?", "Do you read sutra or Bible daily at home?" and "Do you listen to religious programs on TV and radio?") use the anchors "never" and "always".

Personality: Agreeableness and conscientiousness traits were measured using brief adjective lists (Trapnell & Wiggins, 1990) with a four-point Likert scale (1="not at all" to 4="a lot"). Agreeableness was comprised of five adjectives (e.g., warm, helpful, soft-hearted). Conscientiousness was measured using four adjectives (e.g., organised, thorough, responsible, hard-working).

Optimism: was measured using the LOT-R (Scheier et al., 1994) – see Study 1.

Positive reappraisal: was measured using the MIDUS I Scale (Wrosch, Heckhausen, & Lachman, 2000). A four-point anchored response options (1="not at all"; 2="a little"; 3="some"; 4="a lot") is used for each item. Importantly no item (e.g., "Even when everything seems to be going wrong, I can usually find a bright side to the situation"; and "I can find something positive, even in the worst situations") references religiosity. This scale has been shown to be internally reliable ($\alpha = .78$), and to converge with subjective well-being and goal persistence.

Study 3: United States community sample

Participants and sampling

As a final check, data gathered via the *Survey of Midlife Development in the United States* (MIDUS 1995–1996, ICPSR 2760; Brim et al. 2017) was also analyzed. This is a

probability sampled dataset of US adults aged 20–75 years of age. A largely gender-balanced (53% female) completed the items of interest. Of those who responded to the item on religious affiliation ($N = 5942$) most (90.6%) self-identified with a specific religion (in particular, the most notable shares observed were 58.5% Protestant, 26.8% Catholic, 2.4% Jewish).

Instruments and measures

Religiosity: A nine-item questionnaire (eight items used anchored four-point Likert-type response scales) included questions on “How religious are you?”, “How spiritual are you?” and “How often do you attend religious services?” Because the last item uses a five-point response options, all items were factor analysed (Principal Axis Factor). Only one factor with an eigenvalue exceeding unity (and explaining 63.1% of item variance) emerged ($KMO = .864$).

Personality: Brief adjective lists as described in in Study 2 were used to capture trait agreeableness and conscientiousness.

Optimism: was measured using a single item (with four response options).

Positive reappraisal: see description in Study 2.

Results

Before conducting inferential statistical analyses on the three datasets a power calculation for a multiple regression model was undertaken. These *a priori* checks indicated that for a model with five predictors $\alpha = .05$, $\beta = .20$ and a borderline small effect ($f^2 = .075$; i.e., $R^2 = .07$), a minimum sample size of 177 is necessary (G*Power 3.1.9.2). For six predictors, the minimum necessary sample size increases to 189. Under the same Type I and Type II error assumptions, $N = 177$ can detect an effect for a single regression coefficient of $f^2 = .035$.

Australian on-line sample

Descriptive and preliminary analyses

The data gathered was largely distributed normally. Statistically significant correlations among the variables (Table 1) also highlight the need to use multiple

Table 1. Correlation^a and descriptive statistics: Australia ($N = 195$).

	2.	3.	4.	5.	6.	M	SD
1. Age	-.09	.27***	.04	.20**	.23**	31.1	10.7
2. Male	–	-.00	-.16*	-.06	-.18*	.16	.37
3. Optimism		.84	.24***	.19**	.25***	2.32	.69
4. Religiosity/Spirituality			.75	.20**	.28***	3.10	.83
5. Conscientiousness				.88	.12	3.53	.74
6. Agreeableness					.85	4.18	.59

Notes: ^aBolded entries on the diagonal are Cronbach’s α internal consistency.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 2. Hierarchical regression analysis: optimism, ($N = 195$).

	Step 1: $R^2 = .086$		Step 2: $R^2 = .150$		Step 3: $R^2 = .166$	
	β	T	β	T	β	T
Male	.036	.569	.078	1.152	.088	1.296
Age	.294***	4.238	.273***	4.057	.243***	3.531
Religiosity/Spirituality			.257***	3.791	.231**	3.351
Agreeableness					.060	.856
Conscientiousness					.115	1.696

Notes: * $p < .05$; ** $p < .01$; *** $p < .001$.

regression analyses in order to isolate unique effects. Religiosity/Spirituality and optimism were positively correlated ($p < .001$, $CI_{95} [.10: .37]$). Consistent with earlier research, agreeableness ($p < .001$, $CI_{95} [.11: .38]$) and conscientiousness ($p = .005$, $CI_{95} [.06: .33]$) also predict religiosity. Confirming previous contributions, conscientiousness ($p = .008$, $CI_{95} [.05: .32]$) and agreeableness ($p < .001$, $CI_{95} [.15: .40]$) are also associated positively with optimism.

Multivariate inferential analyses

Table 2 shows the hierarchical regression results. Although age is also significant (see Step 3), religiosity remains uniquely related to optimism ($\beta = .231$, $p = .001$, $CI_{95} [.09: .37]$) with about the same magnitude of effect as suggested by the correlation estimate. However, neither agreeableness ($\beta = .060$, $p = .393$, $CI_{95} [-.08: .20]$) nor conscientiousness ($\beta = .115$, $p = .092$, $CI_{95} [-.02: .25]$) remained unique predictors of optimism in this multivariate model.

Japanese sample

Descriptive and preliminary analyses

Data inspection revealed no obvious data distribution violations. Religiosity and optimism were again positively correlated (Table 3, $p < .001$, $CI_{95} [.08: .20]$). Consistent with earlier research and Study 1, agreeableness ($p < .001$, $CI_{95} [.15: .27]$) and conscientiousness ($p < .001$, $CI_{95} [.08: .20]$) are both positively correlated with religiosity. Conscientiousness ($p < .001$, $CI_{95} [.06: .18]$) and agreeableness ($p < .001$, $CI_{95} [.23: .35]$) are also positively correlated with optimism. These statistically significant positive associations again indicate that there is a need to simultaneously estimate the religiosity and trait effects utilising multivariate techniques.

Table 3. Correlation^a and descriptive statistics: Japan ($N = 931$).

	2.	3.	4.	5.	6.	7.	M	SD
1. Male	.03	-.06	-.04	-.12***	.04	-.02	.50	.50
2. Age	-	.03	-.01	.25***	.16***	.07*	53.47	13.95
3. Optimism		.63	.43***	.14***	.12***	.29***	3.24	.61
4. Positive reappraisal			.81	.23***	.34***	.41***	2.64	.66
5. Religiosity				.84	.14***	.21***	1.79	.62
6. Conscientiousness					.74	.58***	2.32	.43
7. Agreeableness						.87	2.63	.60

Notes: ^aCronbach's α bolded entries on the diagonal.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 4. Hierarchical regression analysis: optimism, Japan ($N = 931$).

	Step 1: $R^2 = .005$		Step 2: $R^2 = .021$		Step 3: $R^2 = .093$	
	β	T	β	T	β	T
Male	.064	1.955	.047	1.444	.047	1.481
Age	.031	.940	-.002	-.062	.001	.027
Religiosity			.131***	3.886	.075*	2.257
Agreeableness					.307***	7.852
Conscientiousness					-.065	-1.666

Notes: * $p < .05$; *** $p < .001$.

Multivariate inferential analyses

Tables 4 and 5 show the hierarchical regression results. Although other variables are also significant (see final step in Tables 4 and 5), religiosity remains a unique predictor of both optimism ($\beta = .075$, $p = .024$, $CI_{95} [.01: .14]$) and positive reappraisals ($\beta = .170$, $p < .001$, $CI_{95} [.11: .23]$). Agreeableness ($\beta = .307$, $p < .001$, $CI_{95} [.23: .38]$) but not conscientiousness ($\beta = -.065$, $p = .096$, $CI_{95} [-.14: .01]$) also predicted optimism. Whereas both agreeableness ($\beta = .280$, $p < .001$, $CI_{95} [.21: .35]$) and conscientiousness ($\beta = .176$, $p < .001$, $CI_{95} [.11: .25]$) were significant predictors in the model estimating positive reappraisal.

United States sample

Descriptive and preliminary analyses

As data inspection revealed most variables violated normality assumptions, non-parametric methods were employed (all reported confidence intervals for this study are bootstrap estimations using 5000 resamples). Religiosity and optimism were again positively correlated (Table 6, $p < .001$, $CI_{95} [.10: .16]$). Consistent with Studies 1 and 2, agreeableness ($p < .001$, $CI_{95} [.23: .28]$) and conscientiousness ($p < .001$, $CI_{95} [.07: .12]$) are both positively correlated with religiosity. Conscientiousness ($p < .001$, $CI_{95} [.15: .20]$) and agreeableness ($p < .001$, $CI_{95} [.16: .21]$) are also positively correlated with optimism. Positive reappraisal is positively related to all three predictor variables – religiosity ($p < .001$, $CI_{95} [.18: .23]$), agreeableness ($p < .001$, $CI_{95} [.32: .36]$), and conscientiousness ($p < .001$, $CI_{95} [.22: .27]$). These results again highlight the need to statistically control for personality traits to isolate the religiosity effect.

Multivariate inferential analyses

Regression analyses (Table 7) show that positive reappraisals are predicted by religiosity ($\beta = .120$, $p < .001$, $CI_{95} [.09: .15]$), agreeableness ($\beta = .284$, $p < .001$, $CI_{95} [.26: .31]$) and conscientiousness ($\beta = .162$, $p < .001$, $CI_{95} [.14: .19]$) despite the low reliability of the latter.

Table 5. Hierarchical regression analysis: positive reappraisal, Japan ($N = 931$).

	Step 1: $R^2 = .002$		Step 2: $R^2 = .058$		Step 3: $R^2 = .217$	
	β	T	β	T	β	T
Male	.039	1.178	.007	.220	.018	.625
Age	-.013	-.391	-.075*	-2.272	-.104***	-3.407
Religiosity			.247***	7.430	.170***	5.512
Agreeableness					.280***	7.699
Conscientiousness					.176***	4.859

Notes: * $p < .05$; *** $p < .001$.

Table 6. Spearman rank correlation^a and descriptive statistics: USA (N = 5999).

	2.	3.	4.	5.	6.	7.	M	SD
1. Male	.00	-.03*	.05***	-.21***	-.12***	-.26***	.47	.50
2. Age		-.05***	.05***	.15***	.08***	.03*	45.74	12.83
3. Optimism			.38***	.13***	.18***	.19***	3.29	.76
4. Positive reappraisal			.79	.20***	.25***	.34***	3.16	.61
5. Religiosity (factor)				.92	.09***	.25***	0.00	1.00
6. Conscientiousness					.56	.29***	3.42	.44
7. Agreeableness						.81	3.49	.49

Notes: ^aCronbach's *a* bolded entries on the diagonal.
p* < .05; **p* < .001.

Table 7. Hierarchical regression analysis: positive reappraisal, USA (N = 6012).

	Step 1: R ² = .004		Step 2: R ² = .039		Step 3: R ² = .158	
	β	T	β	T	β	T
Male	-.042**	-3.293	.000	.024	.077***	6.212
Age	.048***	3.740	.019	1.510	.004	.367
Religiosity (factor)			.194***	14.782	.120***	9.516
Agreeableness					.284***	21.769
Conscientiousness					.162***	13.088

Notes: ***p* < .01; ****p* < .001.

Table 8. Hierarchical binomial regression analysis: optimism, USA (N = 6000).

	Step 1: R ² = .004 ^a		Step 2: R ² = .014		Step 3: R ² = .056	
	exp(β)	Wald	exp(β)	Wald	exp(β)	Wald
Male	1.098	3.264	1.002	.002	.833**	10.503
Age	1.118***	18.040	1.084**	9.181	1.069*	5.880
Religiosity (factor)			1.236***	60.241	1.146***	22.902
Agreeableness					1.365***	105.016
Conscientiousness					1.307***	87.881

Notes: ^aThe Cox & Snell R² is reported.
p* < .05; *p* < .01; ****p* < .001.

Given the irreversible skew in the four-point optimism measure, raw self-report scores were dichotomised into binary categories (Highest score = 1, all others = 0) and analysed using binary logistic regression. Table 8 (Step 3) shows that religiosity remains an incremental predictor of higher optimism (*p* < .001, CI₉₅[1.081: 1.213]) alongside agreeableness (*p* < .001, CI₉₅[1.288: 1.451]) and conscientiousness (*p* < .001, CI₉₅[1.235: 1.385]).

Discussion

Multivariate analyses conducted on three culturally diverse samples empirically demonstrate a robust cross-sectional link between religiosity and sanguine cognitions (as measured by optimism and positive reappraisals). Moreover, the result prevails even after statistically removing agreeableness and conscientiousness effects. Broadly-speaking, these results concur with and strengthen the hypothesis that religiosity may facilitate well-being via positive coping styles. That the inclusion of two personality traits (known for co-varying with religiosity/spirituality) did not negate the cross-sectional association with either optimism or positive reappraisals is important evidence regarding the veracity of positive psychology

theories that suggest religiosity is adaptive. This empirical confirmation indicates that religiosity may offer an additional buffer against stress over and above any personality effects.

Although the magnitude of the standardised β in Study 1 largely replicated the simple association (r), the results from Studies 2 and 3 suggest that simple correlation estimates overstate the unique effect size – including agreeableness and conscientiousness as IVs in Step 3 of the HRM typically reduced the effect of religiosity on the outcome measure under examination.

Having said this, the model tested here is not considered to be a complete theoretical account of sanguine cognitions. Other factors that can also be expected to influence respondents' optimism and willingness to reappraise events positively include; biological heredity, developmental history, prior exposure to substantial trauma and surrounding socio-economic conditions (e.g., poverty, social inclusion, etc). However, obtaining a comprehensive predictive model of the constructs under examination was not the central aim of the current paper. The aim here – given religiosity, agreeableness and conscientiousness are consistently found to be co-variables and recent contributions have shown some religiosity effects are better explained by agreeableness and conscientiousness (Schuurmans-Stekhoven, 2017) – was simply to check the veracity of the link between religiosity and a proclivity to use sanguine cognitions. The confirmation of an incremental association when these competing personality explanations were included increases our confidence that religiosity may offer unique adaptive benefits. Furthermore, identifying enduring effects due to socio-demographic and personality variables underscores the necessity to include such variables alongside religiosity in future studies. Only by utilising a multivariate design is it possible to confirm the unique relationship between religiosity and sanguine cognitions (and the relative magnitude of the association). Although the studies vary, from the current data, the effect size of religiosity and the two personality traits appear largely equivalent.

Given that the teachings of Buddhism suggest that desires and positive expectations can be problematic, of the three studies perhaps Study 2 (where most survey respondents reported no religious affiliation and those who did self-identified as Buddhists) is most contentious. But, even though Buddhism discourages followers from overtly pursuing feel-good activities as ends in themselves (instead advocating living mindfully in the moment), positive expectancy and reframing still permeate its teachings. For example, Buddhism advocates enthusiastic perseverance (or *virya*) in combination with right practices (e.g., cultivating generosity, empathy and tolerance) as an effective means of lowering desire and lessening karmic suffering (Gethin, 1998, p. 69). Thus, like other faith-traditions, Buddhism, at an overarching level at least, offers a positive lens for viewing life and purports to be curative. Its central message – that suffering can be minimised – is unashamedly optimistic (Lai, 2015). Likewise, the central Buddhist belief that a transcendental awakening (*nirvana*) is obtainable also betrays its inherent positivity regarding future possibilities. Furthermore identification with multiple religions (sometimes referred to as syncretism) is common in Japan (Josephson, 2012). Thus responses to forced-choice items regarding religious affiliation could, in the Japanese context, mislead. Most respondents who self-nominated as Buddhist have probably had exposure to teachings from a wide variety of faith traditions; including religions that are more overtly positive. It is also noteworthy that high scores on the continuous religiosity scales were observed

among those who indicated no religious affiliation. For these reasons, the Study 2 result is probably best not considered as a strict reflection of a Buddhism effect.

Limitations

Obviously the current contribution can be challenged on several grounds. The most apparent concern is that cross-sectional data cannot establish causation. It therefore remains entirely reasonable to posit that individuals who exhibit pre-existing sanguine cognitive tendencies may be more prone to subsequently adopt a faith-based worldview (i.e., a reverse causation; see for example Saroglou, Buxant, & Tilquin, 2008).

Furthermore, the current research is not an exhaustive summary of the total cognitive effect of religiosity. As an anonymous reviewer kindly made clear, the current contribution is utterly silent regarding the possibility that religious individuals may experience a greater frequency of negative cognitions (or more intense negative states) than the secular. Given that religiosity is a complex psychosocial amalgam, it is entirely possible that despite its apparent adaptive benefits (as shown here and in previous research), religion may be a “double-edged sword”. Indeed Schuurmans-Stekhoven’s (2011, 2017) findings indicate that religiosity’s *net effect* on adaptive function remains contestable.

Another concern is that some unexplored “third variable” may be the cause of both optimism (and/or positive reappraisal tendencies) on the one hand and religiosity on the other. Although this potential is not denied, the results consistently gel with related experimental and survey research on positivity and religiosity (however these earlier studies rarely control for known covariates). The fundamental purpose – as already stated – was simply to test whether the inclusion of agreeableness and conscientiousness altered the statistical association between religiosity and sanguine cognitions. Across three cultures, the results remained robust after controlling for individual trait differences. This consistency in findings now offers considerable impetus for researchers to investigate whether the link is causal in nature (i.e., via quasi-experimental prospective designs that also include agreeableness and conscientiousness as covariates alongside any other theoretically justifiable predictors). Still, given that individual differences in positive reappraisal tendencies, optimism and religiosity cannot be manipulated nor randomly assigned to participants, even these more rigorous methods would remain vulnerable to counterclaims that they are systematically affected by extraneous confounds. Regardless of how these issues are empirically resolved in future, the current paper incrementally validated the cross-sectional association between religiosity and positivity cognitive coping styles.

Conclusion

Religiosity/spirituality measures were correlated with sanguine cognitions in three separate studies – these findings concur with similar bivariate results from earlier North American studies. These positive associations were confirmed in multivariate analyses that included trait agreeableness and conscientious as rival explanations of optimism and positive reappraisals. Although the incremental religiosity effect sizes were small (uniquely explaining around 2%–4% of the variance), this is to be expected given the manifold developmental and biological pathways to sanguine cognitions. These results strengthen

the case that numinous faith might be a beneficial socio-cultural adaptation. Nonetheless caution is warranted as the cross-sectional design employed in all three studies cannot determine causation; possibly a propensity to utilise sanguine cognitions predisposes people to endorse faith-based beliefs (or perhaps some other variable(s) causes both). Despite these limitations, the statistical results were consistent with the expected relationships hypothesised by the incumbent theory and were replicated. At this juncture it appears safe to conclude that the associations between religiosity and optimism, and religiosity and positive reappraising are robust against confounding by personality covariates.

Disclosure statement

No potential conflict of interest was reported by the author.

ORCID

James B. Schuurmans-Stekhoven  <http://orcid.org/0000-0003-4127-4414>

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