



# With a little help from my (Canadian) friends: Health differences between minimal and maximal religiosity/spirituality are partially mediated by social support

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## ABSTRACT

**Rationale:** Higher levels of religion and spirituality (R/S) are associated with better health in both Canadian and American samples. One mechanism that can account for this relationship is social support, which is positively associated with higher R/S and is positively associated with overall wellness. Although social support has been found to mediate the relationship between R/S and health in American samples, parallel research on Canadian samples is lacking.

**Objective:** While having cultural similarities, Canada and the United States have noteworthy differences with respect to religion, politics, and demographics. Consequently, it is problematic to assume that social support accounts for the R/S-health relationship for Canadians. The goal of the current study was to explore whether social support mediated the relationship between R/S and health outcomes.

**Method:** Using individuals  $\geq 20$  years of age from the 2012 Canadian Community Health Survey – Mental Health component ( $N \geq 9043$ ), we isolated people who had either the lowest or highest possible score on a composite measure of R/S. We then compared ‘minimal R/S’ respondents to ‘maximal R/S’ respondents on 11 health outcomes and investigated if these health disparities attenuated when accounting for differences in social support.

**Results:** Maximal R/S was associated with better health for nine of the tested outcomes, but seven of these relationships were attenuated when social support was added to the model. The two remaining outcomes, drug abuse/dependence and alcohol abuse/dependence, were not significantly impacted by the inclusion of social support.

**Conclusion:** Social support plays a mediating role in many R/S-health relationships for Canadians. Although R/S appears to have a statistical relationship with many health outcomes, several of these lack practical significance.

## 1. Introduction

Generally, religion/spirituality (R/S) is associated with better health (Assari, 2013; Felton and Danielsen, 2016; Ransome, 2020; VanderWeele, 2017). However, determining the boundaries of this relationship is challenging because many of the health benefits associated with R/S are also associated with benefits attributed to social support. While there is a large body of literature addressing the R/S-health relationship, it is unclear if R/S is promoting health via a mechanism that is *unique* to an R/S framework, or via a mechanism that is *distinct* from an R/S

framework. This question gains complexity when simultaneously considering culture, as the bulk of North American research addressing R/S-health confines itself to American samples, with little consideration of other countries (e.g., Canada).

### 1.1. Religion/spirituality promotes health

**Psychological wellness.** Religion/spirituality has been positively correlated with a bevy of subjective well-being outcomes, including perceived health (Koenig et al., 2004; Krause, 2010), happiness (Ellison,

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1991), emotional buoyancy (Holt et al., 2005), and life satisfaction (Hsieh, 2003; Lim and Putnam, 2010; Okulicz-Kozaryn, 2010). These data, largely from American sources, are consistent with Canadian research. Dilmaghani (2018a, 2018b; 2018c) reported that Canadians with the highest levels of R/S experience an array of positive psychological outcomes, though the observed relationship was nuanced. In an older study, O'Connor and Vallerand (1990) reported that intrinsic religiosity in an elderly Montreal sample was associated with better life satisfaction, self-esteem, and meaning in life.

Generally, American and Canadian studies tend to agree that higher levels of R/S are associated with better mental wellness. However, this high-level assessment of the R/S-health relationship may be misleading, as substantial denominational and racial differences exist across the border. White evangelical groups are not necessarily equivalent between the two countries (Bean, 2016; Hoover et al., 2002), nor is Black Protestantism the same force in Canada as it is in the United States. Similarly, research on the R/S-health relationship has often noted that racial factors amplify the observed salutary effect (Meyers et al., 2017) and that there are racial variations in attained benefits (Clark, 2020; Krause, 2004). In short, R/S in the United States and Canada have differing identities, priorities, and histories, which justifies exploring this relationship in a Canadian context.

**Mental illness.** Beyond being associated with an array of positive health outcomes, R/S is also associated with the *absence* of a variety of adverse mental health conditions. Church attendance and religiosity are negatively correlated with depression (Koenig et al., 1998; Schnittker, 2019; Steffen et al., 2017) and feelings of psychological distress (Salsman et al., 2005; Steglitz et al., 2012). Religious Canadians are less likely to develop depression (Baetz et al., 2004), mania, panic disorder, and social phobias (Baetz et al., 2006; cf. spiritual Canadians, *ibid*). In short, people higher in R/S are more likely to psychologically flourish, while simultaneously avoiding psychological ailments.

**Substance abuse/dependence.** Religion/spirituality is often associated with proscriptions on risky activities [e.g., excessive drinking, smoking, sexual promiscuity (Ellison and Levin, 1998; Steglitz et al., 2012; Wallace and Forman, 1998)]. Religious individuals display heightened levels of moderation and engage in fewer unhealthy behaviours (Holt et al., 2005). Additionally, heightened religiosity correlates with a decreased rate of alcohol and drug consumption (Ellison and Levin, 1998). Research addressing R/S and substance abuse in Canadian samples echoes American findings. Baetz et al. (2006) noted that religion and spirituality play a mixed role with respect to both drug addiction and alcohol dependence. Tuck et al. (2017) noted that problem drinking is less common in adherents of religious traditions that promote abstinence from alcohol. While the literature on drug and alcohol abuse is scarcer than on other health outcomes, there is a consensus that higher R/S is associated with more desirable health outcomes. Intriguingly, *race* is implicated in the relationship between R/S and substance use, with some research reporting a stronger effect for some racial groups than others (cf. Krause, 2003; and Meyer et al., 2017).

### 1.2. Religion/spirituality promotes social support

Higher levels of R/S are also associated with greater levels of social support [the exchange of resources (Williams, 1995)], which is logical given the interpersonal nature of R/S-based activities (Ellison and George, 1994; Morton et al., 2017; Steffen et al., 2017). However, social support is *also* independently associated with higher psychological wellness (Nguyen et al., 2016; Santini et al., 2020; Wilcox, 1981), reduced incidence of mental illness (Steglitz et al., 2012), and a lower prevalence of substance abuse (Rhodes and Jason, 1990). In other words, the benefits of R/S and the benefits of social support are similar and fraught with nuance. Importantly, social support has contextual factors that may increase or decrease adverse health outcomes. For example, Seid (2016) noted that social networking was positively

associated with alcohol consumption but social participation in community groups (e.g., church) was a negative predictor of alcohol consumption (see Åslund & Nilsson [2013] who noted substance abuse was associated with lower community participation).

The explanatory power of social support for the R/S-health relationship is likely non-uniform and appears to be dependent on which health outcome is assessed [psychological wellness, (Assari, 2013; Fenelon and Danielsen, 2016; Salsman et al., 2005; cf. Shiah et al., 2015), psychological illness (Holt et al., 2005; Park and Roh, 2013; Salsman et al., 2005; Steglitz et al., 2012; cf. Shiah et al., 2015)]. There are also racial components to consider when describing health generally (Efrid and Lightfoot, 2020), and the R/S-health relationship specifically (Assari, 2013). Moreover, because the relationship between R/S-health is often framed in an American context (Assari, 2013; Fenelon and Danielsen, 2016; Salsman et al., 2005; etc.) it is unclear as to how this relationship changes in non-American countries. From a research standpoint, it is unclear if the mechanism driving a portion of the R/S-health relationship in the United States is the same as it is in Canada.

### 1.3. Current study

The Canadian R/S-health literature has kept pace with the American R/S-health literature concerning addressing psychological wellness, mental illness, social support, and (to a limited extent) substance abuse. But there is an absence of literature exploring if social support is responsible for the Canadian R/S-health relationship. We examined several article repositories (EBSCOhost, JSTOR, Google Scholar, etc.) searching for 'Canada', mediati\*, relig\*, and ('social support' or 'social capital') but could not find any relevant article on this topic. While social support is on occasion included as a *covariate* in Canadian R/S-health research (Baetz et al., 2003; Baetz et al., 2006), we could find no literature addressing 'social support as a mediator for the R/S-health relationship' for Canadian samples.

Given that Canadian findings on R/S-health tend to mirror American findings, it is logical to investigate if the same explanatory framework can be used for both countries. However, relying purely on inductive reasoning to draw conclusions about Canada is problematic, as Canadians have become increasingly nonreligious in recent decades when compared to Americans (Brown, 2011). Moreover, as noted in the introduction, there are racial, political, and social differences between the countries that may influence how or *whether* the R/S-health relationship is mediated by social support. The current study used a nationally representative sample of Canadians to explore the relationship that R/S had with psychological wellness, mental illness, and substance abuse, and to determine if these relationships were mediated by social support.

## 2. Method

### 2.1. Data

Researchers accessed data from the 2012 Canadian Community Health Survey – Mental Health version (CCHS-MH; Statistics Canada, 2014) via a public use microfile. The CCHS is a cross-sectional sample of Canadians that employs complex sampling to ensure that the resulting product is generalizable. The CCHS sampling frame covers 97% of the Canadian population, but does not cover people living on Aboriginal reserves, Canadian Forces bases, people who are institutionalized, people living in territories, and people without phones or fixed addresses (Statistics Canada, 2013). We were only interested in respondents who were 20 years of age or older, because respondents who are 15–19 are more likely to live at home and have their R/S attitudes influenced by external sources (e.g., parents), or may still be undergoing substantial identity formation.

## 2.2. Measures

**Religion/Spirituality.** The 2012 CCHS-MH had two questions related to R/S, which were highly correlated ( $r = 0.85$ ). The first question addressed the importance of R/S, “How important are religious or spiritual values in your daily life?”, with a 4-point scale ranging from 1 (*Not at all important*) to 4 (*Very important*). The second question addressed the utility of R/S, “To what extent do religious and spiritual values provide strength to face every day?”, with a 4-point scale ranging from 1 (*Not at all*) to 4 (*A lot*). People who indicated that religious and spiritual values were “Not at all important” and stated that they used them “Not at all” were combined ( $n = 4197$ ). People who indicated that religious and spiritual values were “Very important” and stated that they used them “A lot” were combined ( $n = 6823$ ). Our R/S variable, which was coded 0 (*minimal R/S*) and 1 (*maximal R/S*), will be described as an ‘R/S binary’ to reinforce that we examined the two extremes of R/S. Unfortunately, the 2012 CCHS-MH did not have a question about religious affiliation, which restricted R/S categories to these items (the same variables were used by [Dilmaghani, 2018c](#)).

This approach, only retaining minimum and maximum R/S groups, was desirable for several reasons. First, it simplified the observed relationship between R/S and health. If higher levels of R/S are associated with better health, then logically if we isolated people who were at the minimum and maximum of R/S, this should produce the largest systematic difference ([Dilmaghani, 2018c](#)). Second, an increasing amount of recent research illustrates that R/S does not have a strictly linear relationship with health ([Dilmaghani, 2018c](#); [Fenelon and Danielsen, 2016](#); [Speed, 2018](#)), meaning that treating R/S as continuous may not be appropriate. If we treated R/S as a continuous variable, we ran the risk of attenuating (or otherwise misestimating) the observed relationship that R/S had with health. Third, treating R/S as a minimal/maximal binary is an unintended analytical approach of much of the existing literature. Whenever researchers dummy-code attendance, prayer, religiosity, etc., and then focus on the contrast between the lowest categories and highest categories of R/S, they are in effect only focusing on the minimal/maximal groups (e.g., [Fenelon and Danielsen, 2016](#); [Speed, 2018](#); [VanderWeele, Jackson and Li, 2016](#)). Even though middle groups may be *included* within analyses, they are rarely discussed. To reiterate, the prevailing paradigm within R/S-health research is to compare the ‘absence’ of R/S with an enhanced ‘presence’ of R/S. We produced an online document that duplicated all the analyses of the current study but used all participants regardless of their reported values for R/S (see Online Supplement A). These results were substantively similar and reinforced the approach taken by the current study.

**Social support.** The 2012 CCHS-MH utilized a 10-item version of the Social Provisions Scale (SPS) that has been validated ([Caron, 2013](#); [Gottlieb and Bergen, 2010](#)) as a global substitute version of the 24-item version developed by [Cutrona and Russell \(1987\)](#). The SPS consisted of 10 questions (e.g., “There are people I can depend on to help me if I really need it”) each rated from 1 (*Strongly disagree*) to 4 (*Strongly agree*), with higher values reflecting greater social support. The SPS in the current study showed excellent reliability (Cronbach’s  $\alpha = 0.93$ ; original Cronbach’s  $\alpha = 0.83$ ).

**Health outcomes.** Researchers assessed five health outcomes associated with mental wellness, four health outcomes associated with mental illness, and two health outcomes associated with substance abuse (i.e., 11 outcomes in total).

**Mental wellness.** Researchers distinguished between mental illness and psychological wellness. Generally, psychological wellness was not merely the absence of mental illness but was related to the notion of flourishing.

**Mental Health Continuum.** The Mental Health Continuum – Short Form (MHC-SF) consists of three unique factors and is made up of 14 items in total ([Keyes et al., 2008](#)). Emotional well-being (EWB) consisted of three items (e.g., “How often in the past month have you felt happy?”) and had a Cronbach’s  $\alpha = 0.82$  (original Cronbach’s  $\alpha = 0.83$ ).

Psychological well-being (PWB) consisted of six items (e.g., “How often in the past month have you felt that you liked most parts of your personality?”) and had a Cronbach’s  $\alpha = 0.81$  (original Cronbach’s  $\alpha = 0.83$ ). Social well-being (SWB) consisted of five items (e.g., “How often in the past month have you felt that you have something important to contribute to society?”) and had a Cronbach’s  $\alpha = 0.76$  (original Cronbach’s  $\alpha = 0.74$ ). Questions were rated on a 6-point scale from 1 (*Never*) to 6 (*Every day*) and were then summed together, with higher values reflecting better health.

**Self-rated health.** Perceptions of one’s health were assessed with a single item, “In general, would you say your health is ... ?” and answers were rated on a scale from 1 (*Poor*) to 5 (*Excellent*). Questions similar to this item have been used extensively in previous R/S-health research (e.g., [Koenig et al., 2004](#); [Krause, 2010](#)) and have shown good validity ([National Research Council, & Committee on Population, 2006](#)).

**Satisfaction with life.** Self-rated satisfaction with life was assessed with a single item “... how do you feel about your life as a whole right now?”, using a five-point scale ranging from 1 (*Very dissatisfied*) to 5 (*Very satisfied*). Satisfaction with life has been assessed similarly in other R/S-health research (e.g., [Hsieh, 2003](#); [Lim and Putnam, 2010](#); [Okulicz-Kozaryn, 2010](#)).

**Mental illness.** The 2012 CCHS-MH contained numerous items that examined a variety of clinical outcomes. For all questions, respondents were given the short-form version of the screening tools and were told their responses should be limited to only the past 12 months.

**Distress.** The 2012 CCHS-MH had the complete measure for the K10, which is a measure of distress from [Kessler et al. \(2002\)](#). The K10 contained ten items (e.g., “How often in the past month have you felt tired out for no good reason?”) that were coded from 0 (*None of the time*) to 4 (*All of the time*), and were summed together to produce a total measure of distress (Cronbach’s  $\alpha = 0.86$ ; original Cronbach’s  $\alpha = 0.93$ ).

**Generalized Anxiety Disorder.** The 2012 CCHS-MH had questions to assess generalized anxiety disorder (GAD) that were based on the World Health Organization – Composite International Diagnostic Interview (WHO-CIDI) criteria. Respondents were classified into either 0 (*Did not meet criteria for GAD*) or 1 (*Met criteria for GAD*).

**Bipolar disorder I/II.** The 2012 CCHS-MH recorded variables for both bipolar I and bipolar II based on WHO-CIDI criteria, which were partially consistent with the Diagnostic and Statistical Manual – IV criteria. Respondents were coded either as 0 (*Did not meet criteria for bipolar I/II*) or 1 (*Met criteria for bipolar I/II*).

**Major depressive episode.** The 2012 CCHS-MH had several items that were able to identify people who met the WHO-CIDI criteria for a major depressive episode (MDE). Major depressive episode was coded as 0 (*Did not meet criteria for MDE*) or 1 (*Met criteria for MDE*).

**Substance abuse.** Researchers were interested in drug abuse/dependence (e.g., cannabis, cocaine, heroin, methamphetamine) and alcohol abuse/dependence. Originally, researchers sought to delineate within these categories (e.g., investigate cannabis separately), but this approach was abandoned because it was severely underpowered. Questions were structured similarly for both abuse [e.g., “Was there ever a time in your life when your use of (alcohol, drugs) interfered with your work or responsibilities at school, on a job, or at home?”] and dependence [e.g., “Was there ever a time in your life when you often had such a strong desire to use (alcohol, drugs) that you couldn’t stop using or found it difficult to think of anything else?”]. Based on the number of items people agreed with, they were classified as either 0 (*Did not meet criteria for alcohol abuse/dependence*) or 1 (*Met criteria for alcohol abuse/dependence*) for alcohol; and were classified as either 0 (*Did not meet criteria for drug abuse/dependence*) or 1 (*Met criteria for drug abuse/dependence*) for drugs. These criteria were consistent with WHO-CIDI diagnostic guidelines. The classification paradigm for the derived variables for both drug and alcohol abuse/dependence was complex but is explained by the cited documentation ([Statistics Canada, 2014](#)).

**Covariates.** The current study controlled for multiple covariates, including sex (0 = female, 1 = male), age (1 = 20–24, 2 = 25–29, ... 13

= 80+), age squared (because age often has a quadratic relationship with health; we centered age prior to squaring it in order to reduce issues with multicollinearity), minority status (0 = white, 1 = non-white), marital status (Base = married/common-law, 2 = Widowed/Separated/Divorced, 3 = Single), education (Base = less than high school, 1 = high school, 2 = some post-secondary education, 3 = post-secondary graduate), income decile (1 = 1st income decile, 2 = 2nd income decile, ... 10 = 10th income decile), and region (Base = Atlantic, 1 = Quebec, 2 = Ontario, 3 = Prairies, 4 = BC). See [Statistics Canada \(2011\)](#) for the entire survey questionnaire.

### 2.3. Data analysis

All analyses were conducted with Stata 15. Multicollinearity diagnostics did not reveal any notable issues with correlated predictor variables, and VIF did not exceed 5.00 for any other predictors in the model ([Field, 2013](#)). Because cluster-sampling has been associated with non-random error, we used robust standard errors, which also addressed issues of heteroscedasticity in linear models. We used the probability weights provided by Statistics Canada for all models.

To test if the relationships between the R/S binary and health outcomes were explained by social support, we followed a standard mediational procedure ([Baron and Kenny, 1986](#); [Hayes, 2009](#)). First, we established that moving from minimum to maximum R/S was associated with social support ( $\alpha$ ). Second, we established that the R/S binary was associated with the health outcome ( $\tau$ ). Third, we established that social support predicted the health outcome ( $\beta$ ). Finally, we compared the *initial* coefficient for the R/S binary predicting health ( $\tau$ ), against the *revised* coefficient for the R/S binary predicting health ( $\tau'$ ). If the  $\tau$  and  $\tau'$  coefficients significantly differed, which was assessed by an Aroian z-test, then we concluded that mediation had occurred (see [Fig. 1](#)). If  $\alpha$ ,  $\tau$ , or  $\beta$  were not significant, researchers halted mediational analyses as the mediational framework would not make sense. As a part of data screening, researchers determined that the  $\alpha$ -pathway was significant in all models, and often had virtually identical coefficients/error from one test to another. Consequently, we will not discuss  $\alpha$ -pathways at length because that mediational requirement was always met. Because mediational analyses examined binary outcomes, we used the equations specified by [MacKinnon and Dwyer \(1993\)](#) and [MacKinnon, Warsi, and Dwyer \(1995\)](#), which make pathways in logistic models comparable. For logistic models, the proportion of the effect mediated was calculated using  $(\alpha\beta)/(\alpha\beta+\tau')$ , which tends to produce less biased estimates ([Rijnhart et al., 2019](#)).

Researchers conducted a power analysis using G\*Power 3.1.9.2. Researchers found that all *linear* models had adequate power ( $\beta < 0.01$ ) to detect small differences ( $d \geq 0.20$ ) between the minimal and maximal R/S groups (NB:  $1 - \beta = \text{Power}$ ). In other words, provided an effect was

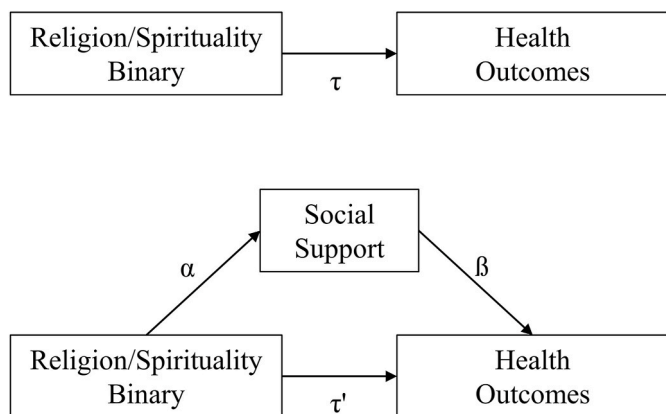
at least at the minimum threshold for something to be considered conventionally meaningful, the current study would find that difference to be statistically significant. However, the ability to detect meaningful differences within *logistic* models was affected by the very low base rate of several of those outcomes, which meant that Type II error was a possibility. As a caveat though, the current study had adequate power ( $\beta < 0.01$ ) to detect a medium effect ( $d \geq 0.50$ ) in all logistic analyses. Please see [Table 1](#), which provides descriptive statistics and power estimates for each of the 11 outcomes.

In each mediational analysis, we provided an indication of the effect size associated with  $\tau'$ , which the reader is urged to consider. We used the effect size cutoffs described by [Cohen \(1992\)](#); where Cohen's  $d < 0.20$  (or Hedges'  $g < 0.20$ ) was interpreted as lacking practical

**Table 1**  
Weighted descriptive statistics for covariates, predictors, and outcomes of interest.

|                              | Total          | Min. R/S       | Max. R/S       | Power for Effect |               |
|------------------------------|----------------|----------------|----------------|------------------|---------------|
|                              |                |                |                | $d \geq 0.20$    | $d \geq 0.50$ |
|                              | 8623           | 3152           | 5471           |                  |               |
| Male                         | 50.17%         | 34.35%         | 60.33%         |                  |               |
| Female                       | 49.83%         | 65.65%         | 39.67%         |                  |               |
| White                        | 70.55%         | 82.14%         | 63.12%         |                  |               |
| Non-White                    | 29.45%         | 17.86%         | 36.88%         |                  |               |
| Married                      | 65.17%         | 58.52%         | 69.44%         |                  |               |
| Wid./Sep./Div.               | 13.45%         | 8.39%          | 16.70%         |                  |               |
| Single                       | 21.38%         | 33.10%         | 13.86%         |                  |               |
| Less than high school        | 14.09%         | 11.37%         | 15.84%         |                  |               |
| High school                  | 15.06%         | 16.27%         | 14.28%         |                  |               |
| Some post-secondary          | 5.22%          | 7.06%          | 4.05%          |                  |               |
| Post-secondary               | 65.63%         | 65.31%         | 65.84%         |                  |               |
| Atlantic                     | 6.31%          | 5.46%          | 6.86%          |                  |               |
| Quebec                       | 21.79%         | 23.36%         | 20.79%         |                  |               |
| Ontario                      | 39.04%         | 36.73%         | 40.53%         |                  |               |
| Prairies                     | 18.42%         | 17.14%         | 19.24%         |                  |               |
| British Columbia             | 14.43%         | 17.31%         | 12.58%         |                  |               |
| Age (blocks of 5 years)      | 6.13/<br>3.39  | 4.84/<br>3.10  | 6.96/<br>3.31  |                  |               |
| Income                       | 5.45/<br>2.85  | 6.17/<br>2.80  | 4.98/<br>2.78  |                  |               |
| Social Provisions Scale      | 36.13/<br>4.37 | 35.97/<br>4.57 | 36.24/<br>4.23 |                  |               |
| Mental Health Continuum      |                |                |                |                  |               |
| Emotional Well-Being         | 15.64/<br>2.50 | 15.33/<br>2.63 | 15.84/<br>2.40 | 1.00             | 1.00          |
| Psychological Well-Being     | 31.54/<br>4.59 | 30.41/<br>5.15 | 32.26/<br>4.03 | 1.00             | 1.00          |
| Social Well-Being            | 21.67/<br>5.76 | 19.70/<br>6.01 | 22.93/<br>5.21 | 1.00             | 1.00          |
| Subjective Well-Being        |                |                |                |                  |               |
| Self-Rated Health            | 2.72/<br>1.00  | 2.73/<br>0.99  | 2.71/<br>1.01  | 1.00             | 1.00          |
| Satisfaction with Life       | 4.29/<br>0.71  | 4.22/<br>0.71  | 4.33/<br>0.71  | 1.00             | 1.00          |
| Clinical Outcomes            |                |                |                |                  |               |
| Distress (K10)               | 5.10/<br>5.50  | 5.73/<br>5.91  | 4.70/<br>5.18  | 1.00             | 1.00          |
| Generalized Anxiety Disorder | 2.69%          | 3.15%          | 2.39%          | .65              | .99           |
| Bipolar Disorder I/II        | 1.74%          | 2.80%          | 1.05%          | .57              | .99           |
| Major Depressive Disorder    | 4.41%          | 5.92%          | 3.44%          | .88              | 1.00          |
| Substance Outcomes           |                |                |                |                  |               |
| Substance Abuse/Dependence   | 1.36%          | 3.01%          | 0.30%          | .62              | .99           |
| Alcohol Abuse/Dependence     | 2.77%          | 5.66%          | 0.92%          | .80              | .99           |

Note. Age is in five-year blocks, where 1 = 20–24, 2 = 25–29, etc.  
 Note. Total N represents respondents who answered all covariates, predictors, and outcomes of interest. The minimum N for any analysis was 9043.  
 Note. Wid./Sep./Div. = “Widowed, Separated, or Divorced”.  
 Note. Emotional Well-Being, Psychological Well-Being, and Social Well-Being are subscales on the Mental Health Continuum – Short Form.



**Fig. 1.** Analytical model testing whether social support mediates the relationship between R/S binary and health.



significance. Both  $d$  and  $g$  refer to  $SD_{\text{pooled}}$  units separating the minimal R/S group and the maximal R/S group. When groups differ by  $\geq 20\%$  of one  $SD_{\text{pooled}}$  unit, this is conventionally interpreted as having ‘practical’ significance. It is important to note that these conventions are somewhat beholden to what outcome is being assessed. For outcomes with ‘fuzzier’ edges it may make more sense to slavishly follow these norms; for outcomes with clear clinical criteria it may make sense to place importance on conventionally trivial differences.

#### 2.4. Missing data and data imputation

One of the strengths of using the 2012 CCHS-MH was its high degree of data completeness; however, nearly all questions had at least *some* missing data. We explored both complete case analysis and data imputation to see if there were substantive differences. For complete case analysis, data exclusions followed the described pattern. We initially started with all data for cases 20 years of age or older ( $N = 23,089$ ). Next, 176 cases ( $<1\%$ ) were dropped because they did not answer the two R/S questions ( $N = 22,913$ ). Then, 12,685 cases were excluded (NB: they were *not* missing) because they did not score at the minimal or maximal level of R/S (leaving us with  $N = 10,227$ ). Next, 64 cases ( $<1\%$ ) were dropped because they did not answer all covariate questions ( $N = 10,163$ ). Finally, 368 cases (3.6%) were dropped because they did not answer all SPS questions ( $N = 9795$ ). Given the steeper drop in SPS scores, we investigated how those missing scores may have impacted our analyses (Sidi and Harel, 2018).

The SPS was built from 10 questions that produced a global score, meaning that if respondents missed an item on the SPS they were dropped. We imputed the missing values for the 10 questions of the SPS with ordinal regression using covariates and the R/S binary as predictors (MICE with 50 imputations). We then built a passive SPS variable that was calculated from the imputed SPS questions. Several of the imputed values were out of range for the SPS scale (i.e., too low), but we recoded the out-of-range scores as the minimum score for the SPS and proceeded with our analyses.

The focus of our study was mediation—which produces a series of coefficients that express the strength of a relationship between a predictor variable, an outcome variable, and a mediator variable—meaning that four substantive differences could emerge between each imputed and non-imputed model (i.e.,  $\alpha$ ,  $\beta$ ,  $\tau$ , and  $\tau'$  could differ across imputed and non-imputed models). To test for these differences, we compared the equality of mediation paths between imputed and non-imputed values (i.e.,  $\alpha_{\text{Non-Imputed}} = \alpha_{\text{Imputed}}$ ,  $\beta_{\text{Non-Imputed}} = \beta_{\text{Imputed}}$ , etc.), using a series of z-tests. To adjust for the inflated Type I error across the 44 tests, we used Bonferroni-Holm corrections. Even without these corrections, mediational pathways showed no significant differences between the imputed and non-imputed model, meaning each of the pathways was statistically equivalent (see Online Supplement B). Given that the imputed values provided similar results to the complete case analysis, we used the complete case analysis as our analytical approach, as it allowed for fewer research degrees of freedom (Simmons et al., 2011).

#### 2.5. Hypotheses

The current study tested a series of mediational models with hierarchical regression (i.e., block regression). For each outcome, every regression model was structurally identical and had the same hypotheses.

**Block 1:** Demographic covariates were entered in the model.

**Block 2:** The religion/spirituality binary was entered in the model.

**H1.** The religion/spirituality binary would be associated with a better health outcome ( $\tau$ -pathway).

**Block 3:** Social Provisions Scale (SPS) was entered in the model.

**H2.** The SPS scores would be associated with a better health outcome ( $\beta$ -pathway).

**H3.** The relationship that the R/S binary had with the health outcome would significantly attenuate with the inclusion of SPS scores ( $\tau'$ -pathway), and this reduction in absolute magnitude would be indicated by a significant Aroian z-test value.

Because of the large number of outcomes that were examined and the amount of reporting required for mediational analyses, we will present the results in a narrative form to facilitate readability. However, we provide complete statistical reporting in the accompanying tables. One table addresses pathway values, effect sizes, and proportions mediated; the other table addresses model statistics and provides a hypothesis summary.

### 3. Results and discussion

#### 3.1. Mental wellness

Overall, **H1** was supported for all models ( $\tau$ -pathways): relative to the minimal R/S group, people in the maximal R/S group reported better mental wellness for all outcomes (see Table 2). When social support was added to these individual models, we found that it was a strong positive predictor of all mental wellness outcomes, which was consistent with **H2** ( $\beta$ -pathways). As can be seen in Table 3, the  $R^2$  attributed to social support was substantial and routinely dwarfed the  $R^2$  contribution made by the R/S binary. Finally, with the inclusion of social support (i.e., SPS), we found consistent evidence for **H3** in all models. The relationships between the R/S binary and individual mental wellness outcomes were significantly attenuated when factoring out the contribution made by social support ( $\tau'$ -pathways). As can be seen in Fig. 2, this ‘shrinkage’ varied by individual outcomes [emotional well-being (39.8%), psychological well-being (25.0%), social well-being (13.8%), self-rated health (33.4%), and satisfaction with life (50.5%)]. In summary, all hypotheses were supported in the context of mental wellness models.

While a substantial amount of literature exists that elevates the relationship that R/S has with SRH and with SWL, this literature tends to focus on statistical significance and not on practical significance. The folly of this approach is clear in Table 2, as the final block of the mediation models illustrated that R/S had a negligible relationship with both SRH and SWL ( $g < 0.10$ ). These relationships were *statistically* impressive but are arguably of little practical importance. Although effect size conventions are not written in stone, the academy must critically assess whether it is reasonable to elevate R/S as being health-promoting. Admittedly, the R/S binary’s relationships with PWB or SWB were robust to the influence of social support, but this may be a consequence of those questions tapping into health correlates as opposed to health. Items on the SWB subscale have the statements, “I belong to a community” and “Society makes sense”, which are obviously supported by attending regular social meetings (e.g., church) or believing in a guided destiny (e.g., intervention via deities). In a similar vein, PWB asks questions like, “My life has direction” which are aided by a belief in guided destiny. This is not to say that SWB and PWB are invalid, but we would argue they may be better thought of as *proxies* for wellness, rather than wellness itself. In a similar sense, researchers can predict an individual’s wellness by factoring in whether or not they jog regularly; *jogging* is not a health outcome but is predictive of a health outcome (e.g., cardiovascular health). Similarly, ‘belonging to a community’ or ‘making sense of the world’ are not health outcomes in themselves, they *predict* health outcomes.

#### 3.2. Mental illness

Overall, **H1** was partially supported – people in the maximal R/S group reported lower levels of distress along with a reduced likelihood of major depressive episode (MDE; see Table 2). However, the maximal

**Table 2**  
Summary of Results for Religion/Spirituality Predicting Health Outcomes, with Social Support as a Mediator (with Effect Sizes)

| Mental Wellness                | Mediational Path b-Coefficients/Robust Standard Error |                         |                         |                         |                         | $\tau'$                | $\tau'$ Effect Size [95% CI] | % Med.       |
|--------------------------------|---|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------------|--------------|
|                                | $\alpha$  | $\tau$                  | $\beta$                 | $\tau'$                 | $\tau'$                 |                        |                              |              |
| <b>Mental Health Continuum</b> |   |                         |                         |                         |                         |                        |                              |              |
| Emotional Well-Being           | 1.10/0.16 <sup>c</sup>                                | 0.58/0.10 <sup>c</sup>  | 0.21/0.01 <sup>c</sup>  | 0.35/0.09 <sup>c</sup>  | 1.37/0.19 <sup>c</sup>  | g = 0.14 [0.07, 0.21]  | 39.83%                       | <sup>c</sup> |
| Psychological Well-Being       | 1.06/0.17 <sup>c</sup>                                | 1.82/0.21 <sup>c</sup>  | 0.43/0.02 <sup>c</sup>  | 0.01/0.06 <sup>c</sup>  | 2.68/0.22 <sup>c</sup>  | g = 0.30 [0.22, 0.38]  | 25.04%                       | <sup>c</sup> |
| Social Well-Being              | 1.07/0.17 <sup>c</sup>                                | 3.11/0.23 <sup>c</sup>  | 0.40/0.02 <sup>c</sup>  | -0.14/0.11 <sup>c</sup> | 2.68/0.22 <sup>c</sup>  | g = 0.48 [0.40, 0.56]  | 13.76%                       | <sup>c</sup> |
| Self-Rated Health              | 1.10/0.16 <sup>c</sup>                                | 0.14/0.04 <sup>c</sup>  | 0.04/0.00 <sup>c</sup>  | -0.07/0.05 <sup>c</sup> | 0.09/0.04 <sup>a</sup>  | g = 0.09 [0.02, 0.16]  | 33.43%                       | <sup>c</sup> |
| Satisfaction with Life         | 1.11/0.16 <sup>c</sup>                                | 0.11/0.03 <sup>c</sup>  | 0.05/0.00 <sup>c</sup>  | -0.31/0.22 <sup>c</sup> | 0.06/0.03 <sup>a</sup>  | g = 0.08 [0.02, 0.16]  | 50.45%                       | <sup>c</sup> |
| <b>Mental Illness</b>          |   |                         |                         |                         |                         |                        |                              |              |
| Distress (K10)                 | 1.11/0.16 <sup>c</sup>                                | -0.74/0.24 <sup>c</sup> | -0.38/0.03 <sup>c</sup> | -0.33/0.04 <sup>c</sup> | 0.01/0.06 <sup>c</sup>  | g = 0.06 [-0.02, 0.13] | 57.00%                       | <sup>c</sup> |
| Gen. Anxiety Disorder          | 0.28/0.04 <sup>c</sup>                                | -0.05/0.07 <sup>c</sup> | -0.33/0.04 <sup>c</sup> | -0.14/0.11 <sup>c</sup> | 0.01/0.06 <sup>c</sup>  | d = 0.02 [-0.25, 0.28] | $\tau$ failure               |              |
| Bipolar Disorder I/II          | 0.28/0.04 <sup>c</sup>                                | -0.20/0.11 <sup>c</sup> | -0.32/0.07 <sup>c</sup> | -0.07/0.05 <sup>c</sup> | -0.14/0.11 <sup>c</sup> | d = 0.31 [-0.14, 0.77] | $\tau$ failure               |              |
| Major Depressive Episode       | 0.28/0.04 <sup>c</sup>                                | -0.12/0.05 <sup>a</sup> | -0.31/0.04 <sup>c</sup> | -0.25/0.07 <sup>c</sup> | -0.07/0.05 <sup>c</sup> | d = 0.15 [-0.07, 0.37] | 56.88%                       | <sup>c</sup> |
| <b>Substance Use Disorder</b>  |   |                         |                         |                         |                         |                        |                              |              |
| Substance Abuse/Dep.           | 0.29/0.04 <sup>c</sup>                                | -0.35/0.07 <sup>c</sup> | -0.09/0.06 <sup>c</sup> | -0.33/0.07 <sup>c</sup> | -0.33/0.07 <sup>c</sup> | d = 0.73 [0.42, 1.04]  | $\beta$ failure              |              |
| Alcohol Abuse/Dep.             | 0.28/0.04 <sup>c</sup>                                | -0.27/0.07 <sup>c</sup> | -0.09/0.05 <sup>b</sup> | -0.25/0.07 <sup>c</sup> | -0.25/0.07 <sup>c</sup> | d = 0.54 [0.25, 0.82]  | $\beta$ failure              |              |

Note. In mediation the  $\alpha$ ,  $\beta$ , and  $\tau$  pathways must be statistically significant; if any pathway fails, the mediated effect is not calculated.

Note.  $\alpha$  = relationship between R/S binary and social support;  $\tau$  = relationship between R/S binary and outcome without the mediator;  $\beta$  = relationship between social support and outcome; and  $\tau'$  = relationship between R/S binary and outcome with the mediator.

Note. All models control for sex, age, age<sup>2</sup>, minority status, marital status, education, income decile, and region.

Note. b-coefficients for logistic models used adjustments for variance to make coefficients comparable.

Note. Cohen's d (logistic models)/Hedges' g (linear models) can be interpreted as d/g < 0.20 (trivial), 0.20 ≥ d/g < 0.50 (small), 0.50 ≥ d/g < 0.80 (medium), d/g ≥ 0.80 (large). However, even 'trivial' gains in well-being could be important in some circumstances.

Note. The b-coefficients for  $\tau$  and  $\tau'$  are the adjusted mean differences between the minimal R/S and maximal R/S.

<sup>a</sup> p < .05.

<sup>b</sup> p < .01.

<sup>c</sup> p < .001.

**Table 3**  
Block 2 and Block 3 statistics for both linear and logistic mediational models, with summary of hypothesis support.

| Linear models                | N    | Block 2             |                                    | Block 3             |                                    | Hypothesis supported? |     |     |
|------------------------------|------|---------------------|------------------------------------|---------------------|------------------------------------|-----------------------|-----|-----|
|                              |      | F                   | R <sup>2</sup> /ΔR <sup>2</sup>    | F                   | R <sup>2</sup> /ΔR <sup>2</sup>    | H1                    | H2  | H3  |
| Emotional Well-Being         | 9724 | 32.84 <sup>c</sup>  | .057/.001 <sup>c</sup>             | 329.13 <sup>c</sup> | .180/.122                          | Yes                   | Yes | Yes |
| Psychological Well-Being     | 9554 | 77.42 <sup>c</sup>  | .063/.028 <sup>c</sup>             | 354.16 <sup>c</sup> | .212/.149                          | Yes                   | Yes | Yes |
| Social Well-Being            | 9043 | 177.36 <sup>c</sup> | .106/.052 <sup>c</sup>             | 342.62 <sup>c</sup> | .189/.083                          | Yes                   | Yes | Yes |
| Self-Rated Health            | 9794 | 13.92 <sup>c</sup>  | .098/.004 <sup>c</sup>             | 119.80 <sup>c</sup> | .129/.031                          | Yes                   | Yes | Yes |
| Satisfaction with Life       | 9767 | 18.25 <sup>c</sup>  | .056/.005 <sup>c</sup>             | 230.02 <sup>c</sup> | .130/.075                          | Yes                   | Yes | Yes |
| Distress                     | 9751 | 9.43 <sup>b</sup>   | .074/.003 <sup>c</sup>             | 145.79 <sup>c</sup> | .159/.084                          | Yes                   | Yes | Yes |
| Logistic models              | N    | Block 2             |                                    | Block 3             |                                    | Hypothesis supported? |     |     |
|                              |      | $\chi^2$            | R <sup>2</sup> <sub>McFadden</sub> | $\chi^2$            | R <sup>2</sup> <sub>McFadden</sub> | H1                    | H2  | H3  |
| Generalized Anxiety Disorder | 9732 | 0.64                | .067                               | 55.53 <sup>c</sup>  | .123                               | No                    | N/A | N/A |
| Bipolar Disorder I/II        | 9753 | 3.53                | .118                               | 23.48 <sup>c</sup>  | .172                               | No                    | N/A | N/A |
| Major Depressive Episode     | 9757 | 5.49 <sup>a</sup>   | .080                               | 55.99 <sup>c</sup>  | .131                               | Yes                   | Yes | Yes |
| Drug Abuse/Dependence        | 9662 | 23.17 <sup>c</sup>  | .180                               | 1.95                | .183                               | Yes                   | No  | N/A |
| Alcohol Abuse/Dependence     | 9687 | 15.56 <sup>c</sup>  | .172                               | 3.06                | .175                               | Yes                   | No  | N/A |

Note. Information about Block 1 statistics are omitted for space.

H1: The R/S binary will be associated with better health.

H2: The Social Provisions Scale will be associated with better health.

H3: The relationship between the R/S binary and health outcomes will attenuate with the inclusion of the Social Provisions Scale.

Note. If H1 failed, then H2 and H3 were not tested. If H2 failed, then H3 was not tested. This is because the steps for mediation were not fulfilled, making the subsequent hypotheses moot.

<sup>a</sup> p < .05.

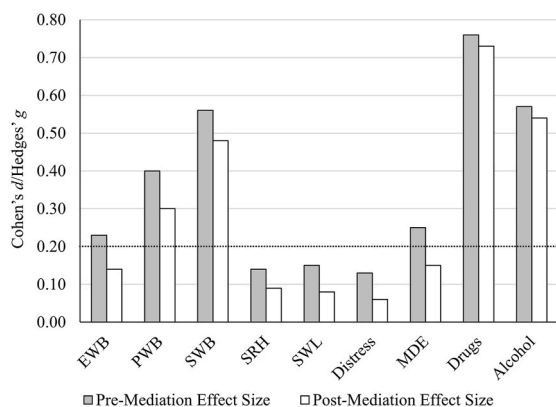
<sup>b</sup> p < .01.

<sup>c</sup> p < .001.

R/S group did not differ from the minimal R/S group concerning generalized anxiety disorder or bipolar disorder I/II. These null findings were inconsistent with H1 but may have been a product of the analyses being underpowered (see the 'Power for Effect' column in Table 1). Importantly though, these models were capable of detecting a medium effect, which would suggest that if the R/S binary is related to GAD or bipolar I/II, then that relationship is likely constrained to being substantially less than g = 0.50. Regarding  $\beta$ -pathways, social support

explained a substantial degree of model variability—as evinced by the large R<sup>2</sup> values and pseudo-R<sup>2</sup> values in Table 3. H2 was supported across the board. However, the mediation question was constrained to only address distress and MDE; social support significantly mediated 57.0% of the relationship between the R/S binary and distress, and 56.9% of the relationship between the R/S binary and MDE (partially supportive of H3).

Although our hypotheses for MDE and distress were supported, we



Note. EWB = Emotional well-being; PWB = Psychological well-being; SWB = Social well-being; SRH = Self-rated health; SWL = Satisfaction with life; Distress = Kessler 10; MDE = Major depressive episode; Drugs = Substance abuse/dependence; Alcohol = Alcohol abuse/dependence.

Note.  $d/g < 0.20$  = trivial effect;  $d/g < 0.50$  = small effect;  $d/g < 0.80$  = medium effect

Fig. 2. Health difference expressed as effect sizes, between minimal R/S group and maximal R/S group, before and after social support is added as mediator.

must think carefully about the implications of these results. We found that ~60% of the relationship between the R/S binary and distress was attributable to social support. However, the initial relationship was quite small ( $g = 0.13$ ), which means that this reduction is not especially impressive (see Fig. 2). This is an example of an R/S-health relationship that is statistically noteworthy but may have questionable ‘real-world’ implications. In contrast, the relationship between the R/S binary and MDE was slightly more substantive: people who reported maximal levels of R/S were less likely to be at risk for MDE ( $d = 0.24$ ). However, once social support scores were included within the analyses, the relationship between maximal R/S and MDE significantly attenuated ( $d = 0.14$ ). In other words, MDE was not meaningfully connected to the R/S binary once the shared variance with social support was accounted for. Given that the outcome is a validated measure of depression, there may be clinical significance to this finding, even though the effect would be conventionally small.

### 3.3. Substance use disorder

The maximal R/S group reported a reduced likelihood of both substance abuse/dependence and alcohol abuse/dependence, which was consistent with H1 (see Table 2). Interestingly, social support was not related to these outcomes and contributed little to explaining the variability in the models (see Table 3). Because social support was nonsignificant (i.e.,  $\beta$ -pathways failed), mediation was not explored for either substance use disorder models. However, the associated effect sizes for the R/S binary were substantial:  $d = 0.73$  for substance abuse/dependence and  $d = 0.54$  for alcohol abuse/dependence. Unlike outcomes in mental wellness and mental illness, social support did not seem to contribute to these positive health outcomes (see Fig. 2).

To play Devil’s Advocate though, it is possible that people who are more likely to report maximal R/S may be more prone to social desirability about substance abuse. Logically, if people are abstaining from substance use because of R/S proscriptions, they must necessarily be aware of those guidelines. Consequently, those people may be less willing to share patterns of substance use because they are aware of the belief-behaviour discrepancy. Alternatively, people who partake in mind-altering substances may be selecting *out* of the R/S group because of the same belief-behaviour inconsistency, as has been shown with individuals who cohabit and their involvement with religion (Uecker et al., 2007).

It may also simply be the case that people reporting maximal R/S report a genuinely lower rate of substance abuse. Research has

previously linked religiosity and *self-control* as being important in predicting substance abuse (Desmond, Ulmer and Bader, 2013), and this has cross-cultural support too (Klanjšek et al., 2012). Interestingly, these findings tend to implicate intrinsic religiosity instead of extrinsic (i.e., social) religiosity as the driving force. In other words, discounting social elements of R/S—which would be relevant to extrinsic religiosity—would not be *expected* to reduce the relationship that the R/S binary had with substance abuse (cf. Meyers et al., 2017). A final possible explanation is that the relationship between R/S and substance abuse is spurious as both are related to a proclivity toward *risk-taking*. Alcohol and drug abuse are archetypes of risky behaviour, and religious individuals tend to score lower on risk-taking behaviours generally, although the exact cause of this is unclear (Bartke and Schwarze, 2008; Miller and Hoffman, 1995; cf. Kupor et al., 2015 who looked at *moral risk-taking*). Consequently, people may be self-selecting into both R/S and alcohol and drug abstinence via a similar mechanism. Future research should examine this question.

### 3.4. Does religion/spirituality have a linear relationship with health?

The underlying logic of using an R/S binary in the current study was to maximize systematic differences with respect to health. This decision was theory-driven as the discussion surrounding the R/S-health relationship tends to suggest that ‘more R/S’ is healthier than ‘less R/S’. This perspective has been the status quo since the 1980s and has only recently come under scrutiny from the academy. To facilitate this critical assessment of the existing literature, we have produced an online document (see Online Supplement A) that recreates the analyses of the current study but retains all participants regardless of their score on the two R/S questions. We sum the two R/S items and treat the resulting 7-point R/S scale as a continuous variable in one set of analyses, and as a seven-point categorical variable in a second set of analyses. While the results generally align with the findings of the current study (particularly when treating R/S as linear), there are three important trends that are visible in the models that treat R/S as categorical.

First, while maximal R/S is the ‘healthiest’ group in 9 of the 11 models, moderate levels of R/S were substantially more likely to be associated with reduced risk for both bipolar disorder and GAD. Intriguingly, these were the two null findings for the  $\tau$ -pathways in the current study and were robust to the inclusion of social support. Second, the categorical treatment of R/S made it evident that R/S did not have a linear relationship with health outcomes. There was not a uniform increase in well-being for many of the variables, and in some cases lower levels of R/S had functional parity with higher levels of R/S. Third, the mediating role that social support had between the R/S categories and health outcome appeared to play a varying role across religious categories. It seemed that social support mediated the relationship between R/S-health for the maximal R/S group, but not for less religious and spiritual groups. This result should be pursued as it may indicate that moderate levels of R/S have a stronger link to health than maximal levels of R/S, once social support is controlled for. These findings, if substantiated, undermine an extensive literature that suggests that ‘more R/S = better health’.

### 3.5. Miscellany

Some readers may wonder whether R/S and social support enjoy a bidirectional relationship, raising questions about the mediational framing employed in this paper. We are unaware of any research that has established such a relationship, but feedback on an earlier draft of this paper drew our attention to this issue. Whether a causal relationship exists does not diminish the thrust of the current study; we are arguing that when controlling for social support, the relationship between R/S and several health outcomes becomes attenuated. Our study illustrates that social support accounts for *some* of the relationship that R/S has with *some* health outcomes (see Fig. 2). Even if this is not framed as

being causal, the results would still suggest that by controlling for social support the relationship between maximal R/S and several health outcomes are substantially attenuated.

It is important to note that the current study does address a concern some scholars have raised about the lack of inclusion of secular individuals and secularism. Often, the R/S-health literature frames research as assessing the difference between 'high R/S' and 'secularism', and researchers will conclude that to be low in R/S is to be high in secularism. While it is true that secularism is more likely to be associated with non-religion than with religion (Hwang et al., 2011), this line of argumentation is deeply flawed. Secularism is not merely the rejection of religious positions but is the concomitant acceptance and endorsement of *other* specific positions (Hwang et al., 2011). In a parallel example, knowing that one does not like baseball does not allow you to conclude that one, therefore, likes hockey. The current study found that minimal R/S was, on occasion, associated with worse health than maximal R/S. While people who are secular are likely contained within the minimal R/S group, it is heterogeneous and cannot be easily summarized, therefore we urge caution in extending these findings to secular individuals.

### 3.6. Limitations

The current study had several limitations. First, participants in the study used their own definitions of religious and spiritual values because they were not provided in the survey. This would imply that different conceptualizations of R/S were reflected in their responses. Regardless of what R/S meant to each individual respondent, the current study suggests that people who believe they value R/S and use R/S, differ with respect to health compared to people who believe they do not value R/S or use R/S. It is possible that a different set of R/S questions may produce substantively different outcomes, although our findings largely align with what we hypothesized. A second limitation was that the current study was reliant on archival data from Statistics Canada, which unfortunately did not contain measures of secular beliefs, behaviors, or values. Much of the R/S-health literature has been framed in the context of low or high R/S and has ignored dimensions of identity and meaning that may vary across those groups. In other words, it would be reasonable to conclude from the current study that maximal R/S is associated with wellbeing for some outcomes, *but not that secularism is associated with worse health*. In a similar vein, because the archival data is cross-sectional, we cannot statistically determine if the mediational paths within the study are causal. Finally, as noted in the description of missing data, people who scored very poorly on health outcomes may have been less likely to respond despite being contained within the sampling frame. While this would only affect a few cases, it is possible that a subset of 'very unhealthy' people may have self-excluded from the dataset.

### 4. Conclusions

The current study demonstrated that the relationship between R/S and health outcomes for Canadians was often a by-product of increased social support. These findings align with American work on the topic and provide evidence that the salutary effects of R/S may be due to the increase in socialization and interaction. The current study reminds researchers to distinguish between statistical significance and practical significance, as many of the relationships between the R/S binary and health outcomes would conventionally be considered 'trivial'. However, the relationship between maximal R/S and lowered substance abuse demonstrates that the mechanisms driving the R/S-health relationships are diverse. There is not a singular, monolithic relationship between R/S and health outcomes, there are myriad relationships of varying magnitude. It is important to note that social support appeared to have a larger proportional effect on health outcomes whose initial relationship with the R/S binary were weak to begin with (e.g., distress, emotional well-

being, subjective well-being). Finally, the current study urges researchers to narrowly interpret the minimal R/S group, and to not assume it is representative of secularism. This false equivalency is common within the literature and it is of little use to the broader study of the R/S-health field.

In closing, while the R/S binary was sporadically linked to better health outcomes, researchers should exercise restraint in promoting a broad R/S-health relationship in Canadians. Many of the observed health effects were quite small and the larger ones were themselves somewhat ambiguous. While maximal R/S was associated with higher scores on health correlates, when more direct measures of health were used, the salutary effects of R/S appeared less clear-cut. Admittedly, a handful of outcomes appeared to be uninfluenced by social support—notably drug abuse and alcohol abuse—but we found ample evidence that other relationships relied on social support. Moreover, the health benefits associated with the R/S binary assumed a person started at the lowest level of R/S and proceeded to the highest level of R/S; even with this substantial shift in attitudes many of the benefits were negligible. Ultimately, while participants in the maximal R/S group reported health benefits that were distinct from social support, many in that group appeared to be getting a little help from their Canadian friends.

### Author contribution

David Speed: Conceptualization, Methodology, Software, Validation, Formal analysis, Data curation, Supervision, Writing - original draft, Writing - review & editing, Visualization, Project administration. Caitlin Barry: Methodology, Software, Validation, Writing - original draft, Writing - review & editing. Ryan Cragun: Conceptualization, Visualization, Writing - original draft, Writing - review & editing, Project administration.

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### Declaration of competing interest

We have no conflicts of interest to report.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2020.113387>.

### References

- Åslund, C., Nilsson, K.W., 2013. Social capital in relation to alcohol consumption, smoking, and illicit drug use among adolescents: a cross-sectional study in Sweden. *Int. J. Equity Health* 12 (1), 33.
- Assari, S., 2013. Race and ethnicity, religion involvement, church-based social support and subjective health in United States: a case of moderated mediation. *International Journal of Preventative Medicine* 4, 208–217.
- Baetz, M., Griffin, R., Bowen, R., Koenig, H.G., Marcoux, E., 2004. The association between spiritual and religious involvement and depressive symptoms in a Canadian population. *J. Nerv. Ment. Dis.* 192, 818–822. <https://doi.org/10.1097/01.nmd.0000146735.73827.85>.
- Baetz, M., Bowen, R., Jones, G., Koru-Sengul, T., 2006. How spiritual values and worship attendance relate to psychiatric disorders in the Canadian population. *Can. J. Psychiatr.* 51, 654–661.
- Baron, R.M., Kenny, D.A., 1986. The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J. Pers. Soc. Psychol.* 51, 1173–1182.



- Bartke, S., Schwarze, R., 2008. Risk-averse by Nation or by Religion? Some Insights on the Determinants of Individual Risk Attitudes. Some Insights on the Determinants of Individual Risk Attitudes. SOEPpaper.
- Bean, L., 2016. The Politics of Evangelical Identity: Local Churches and Partisan Divides in the United States and Canada. Princeton University Press.
- Brown, C., 2011. The people of no religion: the demographics of secularisation in the English-speaking world since c. 1900. *Arch. Sozialgeschichte* 51, 37–61.
- Caron, J., 2013. Une validation de la forme abrégée de l'Échelle de provisions sociales: l'ÉPS-10 items. *Sante Ment. Quebec* 38, 297–318. <https://doi.org/10.7202/1019198ar>.
- Clark, J., 2020. Investment in local health-shaping institutions: reconsidering the role of the religious environment. *Soc. Sci. Med.* 113048 <https://doi.org/10.1016/j.socscimed.2020.113048>.
- Cohen, J., 1992. A power primer. *Psychol. Bull.* 112, 155–159.
- Cutrona, C.E., Russell, D.W., 1987. The provisions of social relationships and adaptation to stress. *Advances in Personal Relationships* 1, 37–67.
- Desmond, S.A., Ulmer, J.T., Bader, C.D., 2013. Religion, self control, and substance use. *Deviant Behav.* 34 (5), 384–406.
- Dilmaghani, M., 2018a. Religious identity and health inequities in Canada. *Journal of and Minority Health* 20, 1060–1074. <https://doi.org/10.1007/s10903-017-0640-2>.
- Dilmaghani, M., 2018b. Religiosity and subjective well-being in Canada. *J. Happiness Stud.* 19, 629–647. <https://doi.org/10.1007/s10902-016-9837-7>.
- Dilmaghani, M., 2018c. Importance of religion or spirituality and mental health in Canada. *J. Relig. Health* 57, 120–135. <https://doi.org/10.1007/s10943-017-0385-1>.
- Ellison, C.G., 1991. Religious involvement and subjective well-being. *J. Health Soc. Behav.* 32, 80–99.
- Ellison, C.G., George, L.K., 1994. Religious involvement, social ties, and social support in a southeastern community. *J. Sci. Stud. Relig.* 33, 46–61. <https://doi.org/10.2307/1386636>.
- Ellison, C.G., Levin, J.S., 1998. The religion–health connection: evidence, theory, and future directions. *Health Educ. Behav.* 25, 700–720.
- Efrid, C.R., Lightfoot, A.F., 2020. Missing Mayberry: how whiteness shapes perceptions of health among white Americans in a rural Southern community. *Soc. Sci. Med.* 112967. <https://doi.org/10.1016/j.socscimed.2019.01.022>.
- Fenelon, A., Danielsen, S., 2016. Leaving my religion: understanding the relationship between religious disaffiliation, health, and well-being. *Soc. Sci. Res.* 57, 49–62. <https://doi.org/10.1016/j.ssresearch.2016.01.007>.
- Field, A., 2013. *Discovering Statistics Using IBM SPSS, fifth ed.* Sage Publishing, ISBN 1526419513.
- Gottlieb, B.H., Bergen, A.E., 2010. Social support concepts and measures. *J. Psychosom. Res.* 69, 511–520. <https://doi.org/10.1016/j.jpsychores.2009.10.001>.
- Hayes, A.F., 2009. Beyond Baron and Kenny: statistical mediation analysis in the new millennium. *Commun. Monogr.* 76, 408–420. <https://doi.org/10.1080/03637750903310360>.
- Holt, C.L., Lewellyn, L.A., Rathweg, M.J., 2005. Exploring religion-health mediators among African American parishioners. *J. Health Psychol.* 10, 511–527. <https://doi.org/10.1177/1359105305053416>.
- Hoover, D.R., Martinez, M.D., Reimer, S.H., Wald, K.D., 2002. Evangelicalism meets the continental divide: moral and economic conservatism in the United States and Canada. *Polit. Res. Q.* 55 (2), 351–374.
- Hsieh, C.M., 2003. Counting importance: the case of life satisfaction and relative domain importance. *Soc. Indic. Res.* 61, 227–240. <https://doi.org/10.1023/A:1021354132664>.
- Hwang, K., Hammer, J.H., Cragun, R.T., 2011. Extending religion-health research to secular minorities: issues and concerns. *J. Relig. Health* 50, 608–622. <https://doi.org/10.1007/s10943-009-9296-0>.
- Kessler, R.C., Andrews, G., Colpe, L.J., Hiripi, E., Mroczek, D.K., Normand, S.L., Zaslavsky, A.M., 2002. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol. Med.* 32, 959–976.
- Keyes, C.L., Wissing, M., Potgieter, J.P., Temane, M., Kruger, A., Van Rooy, S., 2008. Evaluation of the mental health continuum–short form (MHC-SF) in Setswana-speaking South Africans. *Clin. Psychol. Psychother.* 15, 181–192. <https://doi.org/10.1002/cpp.572>.
- Klanjsek, R., Vazsonyi, A.T., Trejos-Castillo, E., 2012. Religious orientation, low self-control, and deviance: muslims, catholics, eastern orthodox, and “bible belt” christians. *J. Adolesc.* 35 (3), 671–682.
- Koenig, H.G., George, L.K., Peterson, B.L., 1998. Religious importance and remission of depression in medically ill older patients. *Am. J. Psychiatr.* 155, 536–542.
- Koenig, H.G., George, L.K., Titus, P., 2004. Religion, spirituality, and health in medically ill hospitalized older patients. *J. Am. Geriatr. Soc.* 52, 554–562. <https://doi.org/10.1111/j.1532-5415.2004.52161>.
- Krause, N., 2004. Common facets of religion, unique facets of religion, and life satisfaction among older African Americans. *J. Gerontol. B Psychol. Sci. Soc. Sci.* 59 (2), S109–S117.
- Krause, N., 2010. Religious involvement, humility, and self-rated health. *Soc. Indic. Res.* 98, 23–39. <https://doi.org/10.1007/s11205-009-9514-x>.
- Kupor, D.M., Laurin, K., Levav, J., 2015. Anticipating divine protection? Reminders of god can increase nonmoral risk taking. *Psychol. Sci.* 26 (4), 374–384. <https://doi.org/10.1177/0956797614563108>.
- Lim, C., Putnam, R.D., 2010. Religion, social networks, and life satisfaction. *Am. Socio. Rev.* 75, 914–933. <https://doi.org/10.1177/0003122410386686>.
- MacKinnon, D.P., Dwyer, J.H., 1993. Estimating mediated effects in prevention studies. *Eval. Rev.* 17 (2), 144–158.
- MacKinnon, D.P., Warsi, G., Dwyer, J.H., 1995. A simulation study of mediated effect measures. *Multivariate Behavioural Research* 30, 41–62.
- Meyers, J.L., Brown, Q., Grant, B.F., Hasin, D., 2017. Religiosity, race/ethnicity, and alcohol use behaviors in the United States. *Psychol. Med.* 47 (1), 103–114.
- Miller, A.S., Hoffmann, J.P., 1995. Risk and religion: an explanation of gender differences in religiosity. *J. Sci. Stud. Relig.* 63–75.
- Morton, K.R., Lee, J.W., Martin, L.R., 2017. Pathways from religion to health: mediation by psychosocial and lifestyle mechanisms. *Psychology of Religion and Spirituality* 9, 106–117. <https://doi.org/10.1037/rel0000091>.
- National Research Council, Committee on Population, 2006. *Aging in Sub-Saharan Africa: Recommendations for Furthering Research.* National Academies Press.
- Nguyen, A.W., Chatters, L.M., Taylor, R.J., Mouzon, D.M., 2016. Social support from family and friends and subjective well-being of older African Americans. *J. Happiness Stud.* 17, 959–979. <https://doi.org/10.1007/s10902-015-9626-8>.
- Okulicz-Kozaryn, A., 2010. Religiosity and life satisfaction across nations. *Ment. Health Relig. Cult.* 13, 155–169. <https://doi.org/10.1080/13674670903273801>.
- Park, J., Roh, S., 2013. Daily spiritual experiences, social support, and depression among elderly Korean immigrants. *Aging Ment. Health* 17, 102–108. <https://doi.org/10.1080/13607863.2012.715138>.
- Ransome, Y., 2020. Is investing in religious institutions a viable pathway to reduce mortality in the population? *Soc. Sci. Med.* 113106 <https://doi.org/10.1016/j.socscimed.2020.113106>.
- Rhodes, J.E., Jason, L.A., 1990. A social stress model of substance abuse. *J. Consult. Clin. Psychol.* 58, 395–401.
- Rijnhart, J.J., Twisk, J.W., Eekhout, I., Heymans, M.W., 2019. Comparison of logistic-regression based methods for simple mediation analysis with a dichotomous outcome variable. *BMC Med. Res. Methodol.* 19 (1), 19.
- Salsman, J.M., Brown, T.L., Brechting, E.H., Carlson, C.R., 2005. The link between religion and spirituality and psychological adjustment: the mediating role of optimism and social support. *Pers. Soc. Psychol. Bull.* 31, 522–535. <https://doi.org/10.1177/0146167204271563>.
- Santini, Z.I., Jose, P.E., Koyanagi, A., Meilstrup, C., Nielsen, L., Madsen, K.R., Koushede, V., 2020. The role of mental health in the association between formal social participation and chronic conditions: a longitudinal mediation analysis using three consecutive waves of the Survey of Health, Ageing and Retirement in Europe (SHARE). *Soc. Sci. Med.* 112906. <https://doi.org/10.1016/j.socscimed.2020.112906>.
- Schnittker, J., 2019. Religion, social integration, and depression in europe: evidence from the European social survey. *Soc. Sci. Med.* 112376. <https://doi.org/10.1016/j.socscimed.2019.112376>.
- Seid, A.K., 2016. Social interactions, trust and risky alcohol consumption. *Health economics review* 6 (1), 3.
- Shiah, Y.-J., Chang, F., Chiang, S.K., Lin, I.M., Tam, W.C.C., 2015. Religion and health: anxiety, religiosity, meaning of life, and mental health. *J. Relig. Health* 54, 35–45. <https://doi.org/10.1007/s10943-013-9781-3>.
- Sidi, Y., Harel, O., 2018. The treatment of incomplete data: reporting, analysis, reproducibility, and replicability. *Soc. Sci. Med.* 209, 169–173.
- Simmons, J.P., Nelson, L.D., Simonson, U., 2011. False-positive psychology: undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychol. Sci.* 22 (11), 1359–1366.
- Speed, D., 2018. Mixed blessings? Religion/spirituality predicts better and worse screening behaviours. *J. Relig. Health* 57, 366–383. <https://doi.org/10.1007/s10943-017-0493-y>.
- Statistics Canada, 2011. Canadian community health survey (CCHS)– mental health [questionnaire]. Retrieved from Statistics Canada <http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5015>.
- Statistics Canada, 2013. Canadian community health survey (CCHS)– mental health [user guide microdata files]. Retrieved from Statistics Canada <http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5015>.
- Statistics Canada, 2014. Canadian community health survey (CCHS) – mental health [derived variables (DV) specifications]. Retrieved from Statistics Canada <http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5015>.
- Steffen, P.R., Masters, K.S., Baldwin, S., 2017. What mediates the relationship between religious service attendance and aspects of well-being? *J. Relig. Health* 56, 158–170. <https://doi.org/10.1007/s10943-016-0203-1>.
- Steglitz, J., Ng, R., Moshia, J.S., Kershaw, T., 2012. Divinity and distress: the impact of religion and spirituality on the mental health of HIV-positive adults in Tanzania. *AIDS Behav.* 16, 2392–2398. <https://doi.org/10.1007/s10461-012-0261-7>.
- Tuck, A., Robinson, M., Agic, B., Ialomiteanu, A.R., Mann, R.E., 2017. Religion, alcohol use and risk drinking among Canadian adults living in Ontario. *J. Relig. Health* 56, 2023–2038.
- Uecker, J.E., Regnerus, M.D., Vaaler, M.L., 2007. Losing my religion: the social sources of religious decline in early adulthood. *Soc. Forces* 85, 1667–1692.
- VanderWeele, T.J., 2017. Religion and health: a synthesis. In: Balboni, M., Peteet, J. (Eds.), *Spirituality and Religion within the Culture of Medicine: from Evidence to Practice.* Oxford University Press, New York, NY, pp. 357–402.
- Wallace, J.M., Forman, T.A., 1998. Religion's role in promoting health and reducing risk among American youth. *Health Education and Behaviour* 25, 721–741.
- Wilcox, B.L., 1981. Social support, life stress, and psychological adjustment: a test of the buffering hypothesis. *Am. J. Community Psychol.* 9, 371–386.
- Williams, H.A., 1995. There are no free gifts! Social support and the need for reciprocity. *Hum. Organ.* 54, 401–409.