



Godless in the Great White North: Assessing the Health of Canadian Atheists Using Data from the 2011/2012 Canadian Community Health Survey

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Abstract

An overlooked reason to study atheism and health is that it provides a reasonably strong test of the broader religion-health relationship. Using data from the 2011/2012 Canadian Community Health Survey ($n > 8000$) I explored the health differences between atheists and eight categories of religious identities (nonreligious, Anglican, Baptist, Christian, Protestant, Catholic, United Church, and All Others). Surprisingly, results showed no substantive differences between atheists and non-atheists for self-rated health, emotional well-being, and psychological well-being. In contrast, results showed substantive and consistent differences between atheists and non-atheists with respect to social well-being. Results appear to suggest that while religious groups report superior scores on *health proxies* relative to atheists, this does not translate into substantive *health differences*.

Keywords Atheists · Canadian Community Health Survey · Self-rated health · Mental Health Continuum—Short Form · Statistics Canada

Introduction

Since the 1980s, there has been exponential growth in research addressing religion/spirituality (R/S) and health outcomes. While the findings of this literature are varied, there tends to be agreement that regardless of the R/S metric used (e.g. church attendance, religiosity, affiliation, beliefs), there is a positive association between R/S and health outcomes (George et al. 2002; Koenig 2013; Levin 1994). While there are metaphorical reams of paper devoted to the study of religion, there has been far less furtiveness in the study of nonreligion. There are perennial calls to rectify the lack of research on atheists, agnostics, humanists, etc. (Brewster et al.

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2014; Galen 2015; Hwang et al. 2011; Weber et al. 2012, 2017; Zuckerman 2009), but only glacial progress in this area has been made. Researchers will correctly note that the relationship between R/S and health *should* include nonreligious respondents because it will help predict the attitudes and behaviours of a growing number of people who are apart from religious traditions. However, there is an additional argument that is often overlooked: perhaps the best reason to study nonreligion and health is that it provides researchers with empirical evidence to confirm, or by extension *disconfirm*, the touted R/S-health relationship.

Rigorously Testing the Religion/Spirituality-Health Connection

Practically speaking, the strongest test of the R/S-health relationship is to compare the most nonreligious elements of a population against the most religious elements of a population. If R/S is uniformly associated with better health (which is contentious; Cragun et al. 2016; Eliassen et al. 2005; Ellison and Levin 1998; Galen 2015), then comparing the ‘most nonreligious’ against the ‘most religious’ will maximize intergroup variability and produce the largest health disparities. Researchers have latched onto comparing ‘low R/S’ against ‘high R/S’ groups but have executed this idea with varying levels of effectiveness. Notably, a large proportion of the literature addressing R/S comes from research which has sampled from virtually (or exclusively) religious populations (e.g. Gauthier et al. 2006; Krause et al. 2001; Ryan and Francis 2012). In these circumstances, when research studies report a positive association between R/S and health, it is beneficial for researchers to pause and reflect on what is being captured within the data. Generally, these findings are only suggesting that R/S is healthy *provided* one is already involved in R/S or is an R/S affiliate. While it is worth noting that religious people report improved health when they attend church or value religion, this is a far cry from suggesting that R/S is intrinsically healthy.

A more valid way of comparing the ‘low R/S’ and ‘high R/S’ groups is to identify people who have actively rejected religion, which is only possible when recruiting from general samples. A logical starting point for these comparisons is to use people who are religiously unaffiliated (i.e. Nones) because they tend to report lower or absent levels of R/S (Baker and Smith 2009). When researchers compare Nones to the religiously affiliated, they often find no health differences (Baker and Cruickshank 2009; Galek et al. 2007; Horning et al. 2011), or health differences that are not particularly substantive (Baetz et al. 2004, 2006). However, interpreting these studies becomes complicated because Nones are a heterogeneous group with members who report attending church, praying, feeling strongly religious, and believing in god(s). Essentially, there is a subset of Nones who behave as though they are religiously affiliated but will *not* indicate that they are a member of any congregation (Baker and Smith 2009; Hackett 2014). So, while comparing Nones to religious groups has merit, these rogue ‘Nones’ are attenuating the strength of comparisons because of the ostensible incongruence between their religious identity and their beliefs and behaviours.

Instead of utilizing Nones to make the ‘low R/S’ and ‘high R/S’ comparison, some researchers will use atheists, which is a group of people who indicate that they do not believe in God or gods (Bullivant and Ruse 2013). Atheists often display the lowest level of R/S when compared to Nones (Baker and Smith 2009), although it is still common to see atheists classified as a part of a heterogeneous None category (e.g. Harris et al. 2008). However, when using this strong version of the ‘low R/S’ and ‘high R/S’ comparison, there is a mixture of findings that cannot be parsed into simple patterns. While there are several ostensible ‘health penalties’ for non-belief (Hayward et al. 2016), other studies find *health benefits* at the same scale (Baker et al. 2018; Hayward et al. 2016). These results are difficult to explain in a uniformly coherent fashion (e.g. DeCamp and Smith 2019) as they seem to disagree with the basic premise that R/S will produce better health outcomes. Atheists are often no better or worse than non-atheists (Park et al. 2012; Sillick et al. 2016; Speed et al. 2018; Zimpel et al. 2019), and when differences do emerge across groups (either positive or negative), they tend to be extremely modest.

National Variations Within the Religion/Spirituality-Health Relationship

One of the limiting factors of studying R/S-health is that the relationship seems to be a product of both personal R/S factors and *national* R/S factors (Eichhorn 2012; Stavrova et al. 2013). Currently, the atheism-health literature comes predominantly from the USA, which is somewhat of an anomaly with respect to its levels of R/S. The USA is the most religious industrialized country in the world by a large margin (Fahmy 2018), and findings addressing the USA may not be applicable to other countries. To this point, Canada is not well represented in the atheism-health literature, partially because it tends to be less religious than its American neighbour (Reimer 2017). However, religion still plays a substantive role in the lives of millions of Canadians, and it would be a mistake to equate “less religious than America” with “not consequentially religious”. Research addressing Canadian atheists is virtually nonexistent and only a few studies have addressed Canadian Nones (Baetz et al. 2004, 2006; Dilmaghani 2018a, b; Speed 2018; Speed and Fowler 2017a, b). Granted, Dilmaghani (2018a) used a proxy measure of atheism in an effort to remedy this deficit; however, these questions functionally amounted to equating low levels of R/S with nonbelief in god(s), an approach that has received heavy criticism (Hwang et al. 2011).

The Current Study

To recap, two identified limitations of the R/S-health literature are the lack of representative research on atheism and health, and the lack of literature addressing Canadian atheists. The current study will use representative data from New Brunswick and Manitoba to compare self-identified atheists to different religious groups on a variety of health outcomes. The current study is the first known paper to address the health of Canadian atheists, while using representative data. The general research

question is whether Canadian atheists differ with respect to health from non-atheist groups.

Method

Data

The Canadian Community Health Survey (CCHS) is a national survey undertaken by Statistics Canada that employs a stratified, randomized cluster-sampling approach to produce a representative sample of Canadians. The CCHS asks a range of questions (e.g. demographics, health service utilization, mental well-being) several of which were of interest to the current study. Unfortunately, because the CCHS is modular (i.e. provinces are asked ‘core questions’ but individually select other topics of interest), only New Brunswick and Manitoba were asked questions related to religion ($N > 8000$). Because the CCHS is given in a standardized fashion with a static battery of questions, it was possible to combine different waves of the survey. Both the 2011 and 2012 versions of the CCHS were chosen for the current study because their coding of religious affiliation had a unique identifier for whether an individual identified as an atheist. To be included in the current study respondents had to answer all covariates of interest, be at least 18 years of age, and answer at least one outcome of interest. The age cutoff was put into place in order to eliminate youth who may not have specifically chosen to be a part of a religious tradition. Respondents who answered relevant questions with “I don’t know” or “Refused to answer” were excluded from the analyses in order to maintain the continuous nature of the data (see Table 1).

Measures

Covariates

I used a battery of covariates to control for shared variance: sex [female (base), male], age (18 years and older), age squared (age has a curvilinear relationship with health), education [less than high school (base), high school, some post-secondary, post-secondary graduate], race [white (base), minority], marital status [married/common law (base), widowed/separated/divorced, single], province [New Brunswick (base), Manitoba], income (units of \$10,000), and year [2011 (base), 2012].

Religion

The 2011 and 2012 CCHS datasets had a collection of dozens of religious denominations of which participants could self-identify. Categories that were defined the same way in both 2011 and 2012, and had over 100 respondents in each of those years, became a category of analysis within the current study (NB: the atheist group had fewer than 100 people both years, but they were the target group of the study

Table 1 Descriptive statistics by each religious group

	Atheist	Non-religious	Anglican	Baptist	Christian	Protestant	Catholic	United Church	All Others
Outcomes									
SRH	3.63/1.04	3.53/1.02	3.62/1.00	3.54/0.98	3.79/0.86	3.58/0.98	3.56/1.00	3.56/0.95	3.63/0.96
EWB	15.13/2.71	15.30/2.69	15.86/2.06	15.70/2.28	15.83/1.83	15.97/1.96	15.88/2.27	15.73/2.26	15.61/2.39
PWB	31.14/3.76	30.83/4.69	31.35/4.67	31.14/4.21	31.65/3.65	31.88/4.06	31.73/4.31	30.91/5.03	31.12/4.61
SWB	18.38/6.02	20.24/5.74	21.41/5.70	22.47/4.83	23.34/4.52	22.27/5.00	22.31/5.38	21.98/5.26	21.79/5.25

SRH self-rated health, EWB emotional well-being, PWB psychological well-being, SWB social well-being

and were made into their own group). I used nine religion categories in each of the analytical models [atheist (base), non-religious, Anglican, Baptist, Christian, Protestant, Catholic, United Church, and All Others]. For brevity, I refer to all categories as ‘religion categories’ although I recognize that this is technically inaccurate for several of the captured groups (e.g. atheists, non-religious).

Outcomes

The current study used four health-related outcomes in the combined 2011 and 2012 CCHS datasets. Self-rated health (SRH) was assessed with the item [“In general, would you say (your) health is... ?”] and was rated with a 5-point scale from 1 (*poor*) to 5 (*excellent*). Generally, SRH-type questions are ubiquitous within R/S-health research and are one of the most consistent findings in the R/S-health literature (Green and Elliott 2010; Krause 2006, 2010). Three other outcomes were assessed, each of which was a subscale of the Mental Health Continuum—Short Form (MHC-SF; Lamers et al. 2011), which is a valid and reliable measure of mental flourishing. The MHC-SF is comprised of a 3-item emotional well-being subscale (e.g. “In the past month, how often did you feel happy?”; approximate $\alpha = .80$), a 6-item psychological well-being subscale (e.g. “In the past month, how often did you feel that you liked most parts of your personality?”; approximate $\alpha = .78$) and a 5-item social well-being subscale (e.g. “In the past month, how often did you feel that you had something to contribute to society?”; approximate $\alpha = .73$), all of which had questions on a 6-point scale ranging from 1 (*never*) to 6 (*every day*). The PMH-SF has been used broadly in international contexts (Keyes 2002; Keyes et al. 2008; Petrillo et al. 2015) and R/S-health research specifically (Dilmaghani, 2018a, b). Because Stata does not allow survey weighting for reliability estimates, approximate reliabilities are reported (NB: only small differences would be present across the weighted and unweighted reliability values).

Data Analysis

All data analysis was conducted with Stata 15 in a secure research data centre (RDC) at a Canadian University. In order to access an RDC, researchers were obligated to complete security checks as well as agree to adhere to data release standards set out by Statistics Canada. The purpose of these release standards is to preserve participant anonymity and ensure data integrity. Statistics Canada vetted all results to ensure that they were consistent with release standards (i.e. minimum cell counts of 10 within descriptive statistics, bivariate regression models were not employed, and reported *N*s were rounded to the nearest multiple of five), which did not adversely impact the release of the data. Please note, an RDC was chosen for a research site as this was the only location in which data on atheists was accessible.

The CCHS uses a complex sampling approach that accounts for various demographic features (e.g. sex, race) and geographical locations (e.g. Toronto, urban/rural). Statistics Canada will use this approach because they wish to produce a sample that accurately reflects the composition of the Canadian population. A

person-level weight is used in all models to ensure that generated point estimates (e.g. b coefficients, M) are accurate. However, because stratified cluster sampling is not a purely random process, the associated *error* of these point estimates is often correlated and deflated (increasing Type I error). To address this issue within the 2011 and 2012 CCHS dataset, Statistics Canada provided the researcher with bootstrap weights so that both the point estimate and their error terms can be accurately assayed. The current study used the `<svy>` command in Stata to weight the data with both a person-level weight (which produced corrected point estimates) and with bootstrap weights (which produced corrected error estimates). Data screening suggested that variance inflation factor (VIF) was not an issue for non-dummy coded and non-cross-product variables (i.e. $VIF \leq 5$ for all predictors; Field 2017). All Stata syntax that was used in the analysis is available upon request.

The current study used hierarchical weighted linear regression models to assess the relationship between religion categories and self-rated health, emotional well-being, psychological well-being, and social well-being. While these models produced measures of effect size (i.e. ΔR^2), this was not an outcome of interest. The current study was specifically interested in *if* atheists differed from other religious groups, and by *how much*. Consequently, the researcher used Hedges' g to determine the extent to which atheists differed from non-atheists, with respect to health outcomes. Specifically, the researcher provided an estimate of Hedges' g as an indicator of the magnitude of health difference between atheists and the comparator groups [$g \geq 0.20$ (small), $g \geq 0.50$ (medium), $g \geq 0.80$ (large)]; any significant group differences that were $g < 0.20$ were considered trivial and not discussed at length given our outcomes (although it is possible in some outcomes these could be conceivably important; Durlak 2009).

Comparing atheists against all other religious groups produced a complicated power analysis as statistical power changed within a single model. For example, a coefficient that compared 100 atheists (base group) to 500 Anglicans (comparator group) would report a different power level than the coefficient that compared 100 atheists to 200 Catholics, even if the comparison happened in the same regression model. The researcher will make a special note of null findings and discuss whether there was adequate power to detect sizeable effects. Specifically, I note whether the point estimate (i.e. the b coefficient) indicates a practical significant effect (Hedges $g \geq 0.20$), irrespective of its significance level. The current study had adequate power ($\geq .90$) to detect medium effects ($g \geq 0.50$) but could conceivably miss effects in the 'small' range (specifically when Hedges' $g < 0.30$).

Block 1: Covariates were entered.

Block 2: Religion categories were entered with the 'atheist' group as the base (i.e. all coefficients in religion categories are the mean difference between atheists and that specific category).

Research question: What is the relationship between self-reported atheism and health? Specifically, do atheists differ from non-atheists with respect to self-rated health, emotional well-being, psychological well-being, and social well-being?

Results

Self-Rated Health

I regressed self-rated health (SRH) onto covariates in Block 1 $F(12, 500)=41.88$, $p<.001$, $R^2=.108$, and onto religion categories in Block 2, $F(8, 500)=1.58$, $p=.127$, $R^2=.112$, $\Delta R^2=.004$. Delving into the results revealed that atheists did not differ from any of the other religion categories (see Table 2). However, because of the size of the atheist group ($n=105$), there was limited power to

Table 2 Religious categorization added in block 2 predicting health outcomes

	<i>b</i> coefficient/Bootstrap Standard Error			
	Self-rated health	Emotional well-being	Psychological well-being	Social well-being
Constant	3.63/0.20***	16.29/0.60***	33.55/0.85***	20.39/1.28***
Sex (Female/Male)	−0.01/0.03	0.01/0.09	−0.05/0.18	−0.46/0.21*
Age	−0.02/0.01**	−0.06/0.01***	−0.10/0.02***	−0.13/0.03***
Age ²	0.00/0.00	0.00/0.00***	0.00/0.00***	0.00/0.00***
Race (White/Non-White)	−0.07/0.07	−0.20/0.21	−0.20/0.41	0.86/0.40*
Married (base)				
Wid./Sep./Div.	−0.01/0.06	−0.46/0.12***	−0.13/0.29	−0.80/0.29**
Single	−0.11/0.05*	−0.82/0.13***	−1.46/0.24***	−0.71/0.27**
< than high school (base)				
High school	0.25/0.06***	0.14/0.12	−0.07/0.25	−0.70/0.38
Some post-secondary	0.06/0.10	−0.39/0.32	−0.74/0.55	−0.54/0.53
Post-secondary	0.27/0.05***	−0.01/0.12	−0.16/0.24	−0.06/0.34
Income	0.04/0.01***	0.05/0.01***	0.07/0.03**	0.14/0.03***
Year (2011/2012)	0.05/0.04	0.40/0.10***	0.98/0.21***	0.54/0.23*
New Brunswick/Manitoba	0.05/0.04	−0.11/0.09	−0.29/0.18	0.12/0.23
Atheist (Base)				
None	0.00/0.15	0.16/0.53	−0.38/0.63	1.82/1.17
Anglican	0.24/0.16	0.51/0.52	−0.14/0.71	2.91/1.23*
Baptist	0.17/0.15	0.38/0.52	−0.30/0.64	4.07/1.26**
Christian	0.24/0.15	0.76/0.54	0.62/0.63	4.87/1.26***
Protestant	0.28/0.16	0.64/0.53	0.60/0.65	3.72/1.25**
Catholic	0.15/0.14	0.61/0.51	0.36/0.59	3.84/1.15**
United Church	0.18/0.15	0.39/0.54	−0.46/0.71	3.42/1.21**
Other	0.18/0.15	0.38/0.51	−0.19/0.60	3.22/1.13**
$R^2/\Delta R^2$ for Block 2	.112/.004	.049/.005	.039/.006	.052/.022***

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

detect small effects. As can be seen within the results, several group differences were estimated to be $g \geq 0.20$ (i.e. Anglicans, Christians, and Protestants), so it is possible that several of the null findings are Type II errors (see Fig. 1). With that caveat though, it is important to note that even *if* differences did exist between atheists and non-atheists, these differences would seem to be trivial-to-small and are only present in selected religion categories.

Emotional Well-Being

I regressed the emotional well-being (EWB) subscale from the Mental Health Continuum—Short Form (MHC-SF), onto covariates in Block 1, $F(12, 500) = 9.18$, $p < .001$, $R^2 = .043$, and religion categories in Block 2, $F(8, 500) = 1.46$, $p = .168$, $R^2 = .049$, $\Delta R^2 = .005$. Again, there were no statistical differences between atheists when compared to all other religion categories. However, due to the low number of atheists ($n = 105$) it is possible that the lack of statistical differences is a product of Type II error. Several groups—specifically the Christian, Protestant, and Catholic groups—crossed the threshold for practical significance, but each of these observed effects was small ($g < 0.30$). Again, if there are differences between atheists and non-atheists with respect to EWB, they appear to be bounded within the trivial-to-small range, and only apply to select religious groups and not others (see Fig. 2 and Table 2).

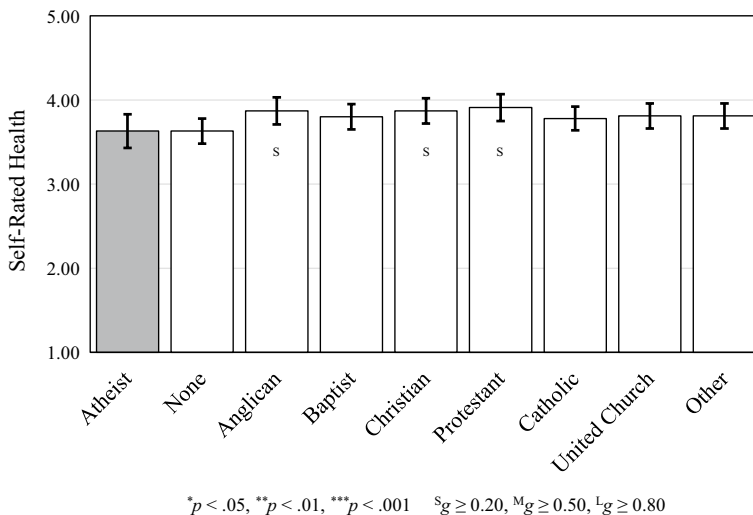


Fig. 1 Differences in Self-Rated Health comparing atheist and non-atheist groups (with bootstrap standard error bars), along with indicators of statistical significance and effect size (i.e. Hedges' g). Atheists did not statistically differ from any of the other groups, but three of the groups reported point estimate differences that could have been of practical significance

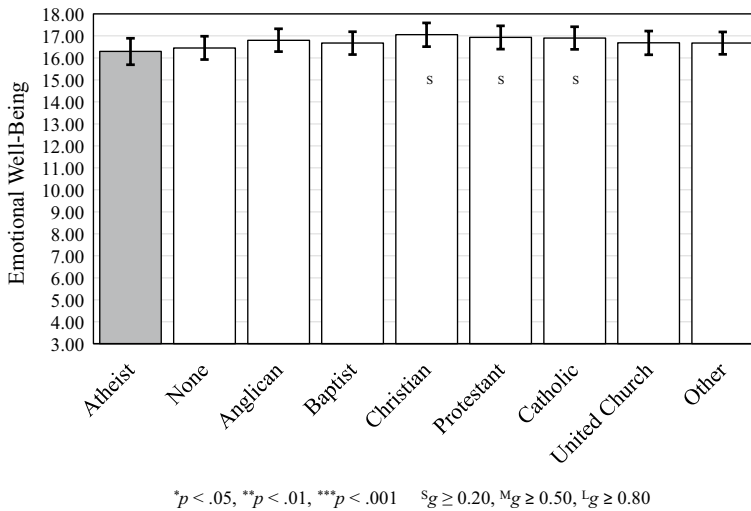


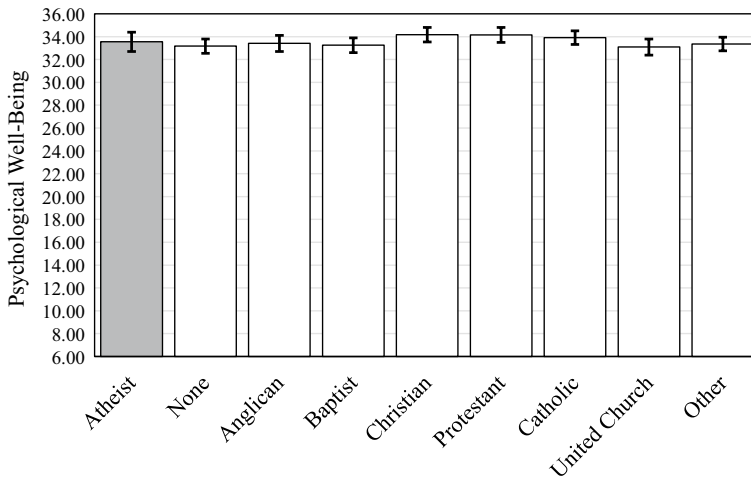
Fig. 2 Differences in Emotional Well-Being comparing atheist and non-atheist groups (with bootstrap standard error bars), along with indicators of statistical significance and effect size (i.e. Hedges' g). Atheists did not statistically differ from any of the other groups, but three of the groups reported point estimate differences that could have been of practical significance

Psychological Well-Being

I regressed psychological well-being (PWB) onto covariates in Block 1 $F(12, 500) = 7.76$, $p < .001$, $R^2 = .033$ and religion categories in Block 2, $F(8, 500) = 2.22$, $p = .025$, $R^2 = .039$, $\Delta R^2 = .006$. While the model change was statistically significant for Block 2, none of the religion categories differed from the atheist base ($n = 95$). When looking at the individual group comparisons, researchers could not establish any meaningful differences between atheists and any other religion categories. Even when looking at effect sizes, researchers would note that all group differences were below the threshold for practical significance ($g < 0.20$), suggesting that atheists reported comparable psychological health to the non-atheist groups (see Fig. 3 and Table 2).

Social Well-Being

I regressed Social Well-Being (SWB) onto covariates in Block 1, $F(12, 500) = 6.74$, $p < .001$, $R^2 = .030$, which improved the prediction of the variability in scores. Religion categories were added in Block 2, $F(8, 500) = 4.82$, $p < .001$, $R^2 = .052$, $\Delta R^2 = .022$, which significantly improved the overall model. While atheists did not differ from Nones $t = 1.55$, $p = .121$, $b = 1.82$, 95% CI $[-0.49, 4.13]$, $g = 0.32$ (perhaps a Type II error), they differed from all other religious groups including: Anglicans $t = 2.36$, $p = .019$, $b = 2.91$, 95% CI $[0.49, 5.34]$, $g = 0.50$; Baptists $t = 3.22$,



* $p < .05$, ** $p < .01$, *** $p < .001$ $^s g \geq 0.20$, $^m g \geq 0.50$, $^l g \geq 0.80$

Fig. 3 Differences in Psychological Well-Being comparing atheist and non-atheist groups (with bootstrap standard error bars), along with indicators of statistical significance and effect size (i.e. Hedges' g). Atheists did not statistically differ from any of the other groups, nor were any point estimates within practical significance

$p = .001$, $b = 4.07$, 95% CI [1.59, 6.55], $g = 0.71$; Christians $t = 3.88$, $p < .001$, $b = 4.87$, 95% CI [2.40, 7.34], $g = 0.84$; Protestants $t = 2.98$, $p = .003$, $b = 3.72$, 95% CI [1.26, 6.17], $g = 0.64$; Catholics $t = 3.34$, $p < .001$, $b = 3.84$, 95% CI [1.58, 6.10], $g = 0.67$; United Church members $t = 2.83$, $p = .005$, $b = 3.42$, 95% CI [1.04, 5.80], $g = 0.59$; and members of All Other religious groups $t = 2.86$, $p = .004$, $b = 3.22$, 95% CI [1.01, 5.44], $g = 0.56$. These findings showed that non-atheists reported significantly and meaningfully higher SWB than the atheist comparator (see Fig. 4 and Table 2). The implication of each of these findings will be discussed now.

Discussion

The current study built on existing literature that has explored the relationship between R/S identity and health outcomes. Whereas the R/S-health literature has several instances of religious affiliation predicting health outcomes in Canadian samples, the current study chose to explore atheists. Atheists and non-atheists reported extremely similar levels of SRH, EWB, and PWB. For each of these, there were no statistically significant differences between atheists and non-atheists, suggesting that belief in god(s) is ostensibly irrelevant to these health outcomes. While other researchers have used proxy measures of atheism to assess the health of Canadians (Dilmaghani 2018a), I could not confirm health deficits in the atheist group. For all intents and purposes atheists did not substantially deviate from non-atheist groups. The findings from the current study suggest that the relationship between R/S-health

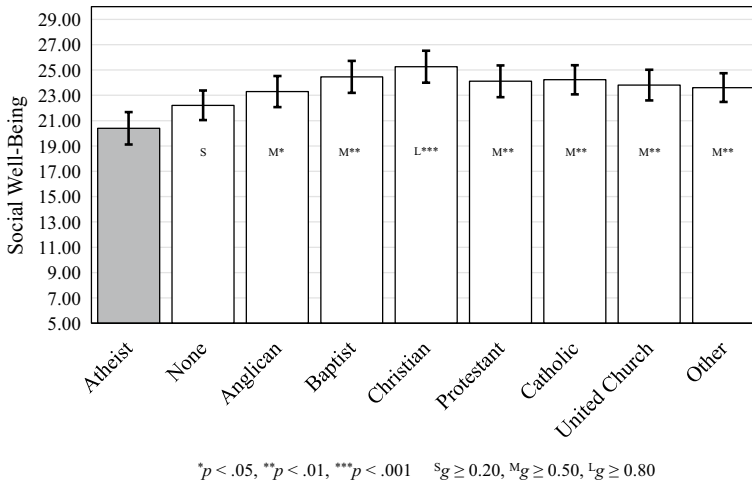


Fig. 4 Differences in Social Well-Being comparing atheist and non-atheist groups (with bootstrap standard error bars), along with indicators of statistical significance and effect size (i.e. Hedges' g). Atheists statistically differed from all religious groups and reported practical effect differences for each of those groups. Atheists did not statistically differ from Nones, but the point estimate could have been of practical significance

does not appear to hold for atheists, which may indicate an issue with how this literature is traditionally conceptualized.

Because null hypothesis significance testing does not lend itself to accepting the null hypothesis, it is helpful to frame the current study in a way that is aligned with scientific discussion. *If* there was a medium effect size or larger (i.e. $g \geq 0.50$), the current study had an average power level of $\sim .95$ to detect it when comparing the atheist group against all non-atheist groups. Because no such differences were found for SRH, EWB, and PWB—despite the current study using a representative sample, with accepted metrics of assessment, and with an adequately-powered test—it is reasonable to say that these null findings are suggestive of *no* difference between the atheist and non-atheist groups *at a medium effect size level* (or larger).

However, null findings became ambiguous when considering small effect sizes (i.e. $g \geq 0.20$). If the current study had had a larger sample of atheists, several of the differences between the atheist and the non-atheist groups would have been both statistically and practically significant (provided the point estimates remained stable). However, these hypothetical effects were non-uniform and would not fit neatly into the 'more R/S=better health' framing that is common. Specifically, Anglicans, Protestants, and Catholics reported effect sizes of Hedges' $g \geq 0.20$ for SRH; while Christians, Protestants, and Catholics reported effects Hedges' $g \geq 0.20$ for EWB. Framed differently, members of *some* religious affiliations reported health differences when compared to atheists, but most did not. Moreover, it is important to note that even if the effects had been statistically significant, the observed effects would *barely* pass the $g \geq 0.20$ threshold. If these differences are indeed genuine—which should be entertained as a possibility—then the difference in health between

self-identified atheists and select religious affiliations is extremely modest. As a point of comparison, the advantage of being a Protestant or a Catholic in terms of SRH or EWB compared to being an atheist, is *less* than the health advantage of driving a silver car relative to a white car for reporting an injury in a car accident (Furness et al. 2003). The effects are occasionally there in a *technical* sense, but they are sporadic and inconsistent.

Furthermore, when PWB was included within analyses, the notion of R/S having a monolithic and positive relationship with health became progressively less credible. While both the Protestant and Catholic group *may* have reported small practical health advantages for SRH and EWB, this did not appear to be a part of a larger trend in which being religiously affiliated was associated with better health. While Protestants and Catholics *may* be healthier than atheists, it is unclear as to why other religious groups (e.g. Baptists) would also not be healthier than atheists, and why Protestants and Catholics would report better SRH and EWB, but not PWB. Functionally, if one wanted to entertain the narrative that R/S promotes health, one would be curious about the varied and inconsistent results.

In contrast to SRH, EWB, and PWB, there *were* significant and practical differences between atheists and all seven religious groups assessed with respect to SWB. Except the None group—who still reported an improvement in SWB equivalent to $g=0.32$ —every comparator group reported substantial advantages in social wellness compared to atheists. Whereas the differences between atheists and non-atheists tended to be quite small with respect to SRH, EWB, and PWB, the differences in SWB were in the medium-to-large effect size range and were significant across the board. The *smallest* difference between atheists and religious groups with respect to SWB was nearly twice the *largest* difference between atheists and religious groups when assessing SRH, EWB, or PWB. Basically, while one would find it challenging to justify an *a priori* R/S-health relationship with only the results of the SRH, EWB, and PWB models, it is evident that a systematic difference between atheists and non-atheists emerges when considering SWB. This jarring reversal in outcomes is intriguing, and it is informative to consider *what* questions were specifically included within the SWB subscale.

While one may be inclined to treat SWB as a measure of social support—which is understandable given its name and several of its items—this would be a mistake. While atheists score lower on social support (Hayward et al. 2016; Horning et al. 2011 and inconsistently in Giannini et al. 2018), the SWB subscale is asking conceptually unique questions related to social integration (“I belong to a community”), social acceptance (“People are good”), social contribution (“I contribute to society”), social actualization (“Society is becoming a better place”), and social coherence (“Society makes sense”). Looking at the wording of these questions two things become quickly evident: first, the questions are not intrinsically health-related. While the EWB subscale dealt with happiness and life satisfaction (mental health outcomes), and the PWB subscale dealt with “Liking oneself” and “Purpose in life” (~health related outcomes), the SWB subscales are not tied to health in a concrete manner. Items within the SWB are ‘markers’ for health (Keyes 1998), but they are not measuring wellness in themselves. Second, it is not surprising that religious groups would report greater levels of SWB relative to atheists given that religious

frameworks would likely predispose a person to answering positively for several items. While the SWB subscale is part of Keyes' research on flourishing, it uses items that have been explicitly linked to theoretical mechanisms accounting for the R/S-health relationship (e.g. coherency; Keyes 1998). In a sense, several of the roots of the SWB subscale are drawn from research that is used to explain the benefits of R/S on health, so it cannot be shocking that religious groups report higher SWB.

To clarify this point, it is undeniable that non-atheists report substantively higher levels of SWB compared to self-identified atheists. However, this should not be construed as suggesting that there is a 'health penalty' for atheists, as the items on the SWB subscale do not directly correspond with physical or mental well-being. Social Well-Being is functionally a proxy measure for health but is not a health itself. In a parallel example, the medical value of knowing that someone exercises is because exercise predicts useful health outcomes with respect to functionality, mortality, etc.; but exercise is not in itself a health outcome. Given that the difference between atheists and non-atheists on SRH, EWB, and PWB was functionally non-existent, the importance of the differences in SWB being *predictors* of health becomes muddled. Basically, atheists and non-atheists substantially differed on an *indirect* indicator of health, but not on the *direct* indicators of health.

What can one make of the R/S-health hypothesis given the results of the current study: was it a series of Type II errors or are there genuinely absent effects? Of these two possibilities the latter seems far more likely. The current study used representative data, used outcomes that have been researched in the context of R/S health, and compared a group that would be 'low R/S' against all other R/S identities. If R/S is salutary then why could the current paper not find substantive and clear health penalties associated with being an atheist? To reiterate this point, individuals had to identify as atheist in the current study, which means the atheist designation is not a byproduct of classifying all nonbelievers as atheist (Bullivant and Ruse 2013)—people in the atheist category were likely removed from religion (Baker and Smith 2009) and not merely apathetic. Functionally, each of the models was biased *towards* finding a positive effect of religious affiliation. There was no control over social support or social integration, which is thought to be a substantial component of *why* R/S produces salutary effects. Granted, these differences in social support do not always emerge in all samples (e.g. Cragun et al. 2016), but non-atheist groups tend to have several advantages with respect to relying on others in times of need. The current study 'stacked the deck' for finding an effect, but still was largely not able to find anything of note.

Genuinely absent effects are also plausible for a separate reason beyond the setup for the current study: this is largely consistent with the existing literature on the topic. Hayward et al. (2016) noted atheists report comparable levels of subjective health, comparable levels of positive affect, similar life satisfaction, and similar depression when compared to the religiously affiliated. Similar null findings were found by Moore and Leach (2016) who found that atheists reported similar scores on the subscales of the Positive and Negative Affect Schedule. Baker et al. (2018) noted that atheists reported similar health (or better health) than the religiously affiliated with respect to physical health, mental health, depression, and a slew of other outcomes. To be blunt, finding that atheists have comparable health is not so much a

quirky result as it is a *normative* result (see also Park et al. 2012; Sillick et al. 2016). Admittedly, some studies will report that atheists are less healthy than other religious groups, although there is surprising variation in what gets packaged in with the concept of health. In some cases, R/S language is included in the conceptualization of wellness (or fitness), which is associated with atheists performing more poorly on those outcomes (Hammer et al. 2013). Alternatively, researchers may find that atheists show deficits in gratitude or optimism, despite these being tangential to core questions of well-being (Hayward et al. 2016).

Limitations and Conclusions

The current study had several limitations that should be addressed. While the sample was representative, only the provinces of New Brunswick and Manitoba were present within the data. Consequently, the conclusions from the current study, while *potentially* generalizable to the broader Canadian population, should be scrutinized in other provinces as well. In a related vein, because only ~100 atheists were sampled, the analyses for SRH, EWB, and PWB were underpowered to detect effects that had just crossed the threshold for practical significance (Hedges' g between 0.20 and 0.35). Consequently, while the current study could not state that there were *no* differences between many of the atheist and non-atheist groups, it would be reasonable to suggest that if a difference between the groups existed it would be constrained to being small. Separately, the current study was limited to which health outcomes it could assess. While SRH, EWB, PWB, and SWB have been examined in other contexts, it would have been beneficial to see a wider array of health outcomes. Finally, determining whether someone was an atheist was achieved via self-identification as opposed to some other method [e.g. asking a respondent if they believe in god(s)]. While self-identification works well in many circumstances, because religious definitions tend to be more abstract than concrete, it is possible that misclassification occurred on some level (Hackett 2014). With these caveats aside, it is important to note that this study was able to achieve a representative sample of Canadian atheists and investigate their respective health outcomes, a first in the R/S-health literature.

While there is the notion of a 'health penalty' with respect to nonreligion, the current study could not find convincing evidence of this within the 2011 and 2012 CCHS data. There were few meaningful differences between atheists and non-atheists across self-rated health, emotional well-being, and psychological well-being, suggesting that if a 'health penalty' exists, it is either not present in these outcomes or is quite small. However, there were noteworthy differences between atheists and non-atheists with respect to social well-being, but these differences were not health outcomes *per se*. This produces a puzzle for researchers as atheists scored lower on health *proxies* than non-atheists but largely reported similar health *outcomes* to non-atheists. Given the widespread promotion of the R/S-health relationship—paired with the conspicuous absence of unhealthy atheists—there must be a critical and frank discussion surrounding the *meaningful* benefits of theism, attending church, religiosity, etc. Pointing to capricious and small statistical differences seems to be a

quintessential mountain-molehill mistake. In closing, it is unclear if atheists in the current study were *good* without God, but they certainly seemed *well* without God.

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Compliance with Ethical Standards

Conflict of interest The author has no conflict of interest to report.

Ethical Approval This study adheres to the ethical standards of s2.2 of the Tri-Council Policy Statement regarding the secondary use of data.

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