Religiosity, impulsivity, and compulsivity in university students

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Abstract

Objectives. Prior research suggests that religiosity may be associated with healthier levels of mental health in certain domains (eg, higher self-esteem and lower rates of substance use problems). However, very little is known about religiosity and impulsive plus compulsive tendencies. This study examined associations between religiosity and impulsive and compulsive behaviors and traits among university students.

Methods. Nine thousand, four hundred and forty-nine students received a 156-item anonymous online survey which assessed religiosity, alcohol and drug use, mental health issues, and impulsive and compulsive traits. Two groups of interest were defined: those with high religiosity, and those with low religiosity, based on *z*-scores. The two groups were compared on the measures of interest.

Results. Three thousand, five hundred and seventy-two university students (57.1% female) responded to the survey. Those with high levels of organizational religious activity, as well as those with high levels of intrinsic or subjective religiosity, differed from their fellow students in having better self-esteem, being less likely to have alcohol or drug problems, and generally being less impulsive in terms of attention and planning. Compulsivity did not differ between groups. Associations were of small effect size except for the link between religiosity and lower impulsivity, which was of medium effect size.

Conclusion. This study shows a link between higher religiosity and lower impulsivity, as well as higher levels of mental health across several domains. Whether these associations are causal—and if so, the direction of such causality—requires rigorous longitudinal research.

Introduction

Religion has had an enduring impact on human society and has shaped how countless people perceive themselves and their world.[1] Although the evolutionary basis of religion continues to be debated, some conceptual approaches view religion as either a byproduct of fundamental cognitive processes or as an adaptive social system designed to promote cooperation and other prosocial behaviors.[2] Given that religion appears to have adaptive value, it is perhaps unsurprising that most studies support a positive association between religiosity and mental health.[3,4] The behavioral mechanisms that may explain these findings across diverse cultures, however, are a matter of controversy.[5]

Religiosity has also shown some association with spirituality, but there are differences between these constructs. Spirituality is a broader concept than religiosity, and there are many people who refer to themselves as spiritual and yet not religious. Whereas religion represents a socially organized system of beliefs,[6] spirituality is usually defined by the individual and often refers to a person's sense of meaning in life and a connection to a power greater than the self. Studies in the field of addictions have suggested that both religiosity and spirituality often increase self-control over unhealthy behaviors by giving people a feeling of purpose, reinforcing core values, and promoting cognitive changes.[7-9]

According to an emerging body of evidence, the religion-health relationship may be partially explained by the concept of self-control.[10-12] Self-control is a construct linked to several distinct cognitive processes and personality traits, including conscientiousness (an index of one's tendency to be organized, responsible, and hardworking) and the ability to delay immediate gratification. By these measures, the more religious a person is, the greater the capacity for self-control, on average, compared to nonreligious counterparts.[11-14] Indeed, self-control is thought to be a crucial element of religious practice—consider that virtually all religions require their members to participate in effortful ritual practices or behaviors, such as public prayer or fasting, that require the exercise of self-control.[11,12] In turn, self-control may promote greater subjective psychological well-being[15] or mediate the relationship between religiosity and health-related behaviors (eg, substance use).[16] Notably, studies of diverse social groups have found that

subjective well-being is better predicted by involvement in institutional religious practices (eg, attendance at religious services) than by private religious practice or personal religious belief.[12] Private or subjective forms of religiosity, however, may preferentially benefit some clinical populations.[12]

Relevant to the social construct of "self-control" are the concepts, from the neurosciences, of impulsivity and compulsivity. Impulsivity refers to the tendency toward hasty or poorly thought out actions, leading to untoward actions,[17] whereas compulsivity is the tendency toward repetitive habitual actions that persist despite consequent functional impairment.[18] These two processes contribute at different stages in the progression from a potentially risky act (eg, drinking alcohol or gambling) through to getting "stuck" in these behaviors. Impulsivity and compulsivity can be fruitfully measured using convenient self-report questionnaires.[19]

Young adulthood is a time when many individuals engage in and struggle with controlling unhealthy behaviors, but little is known about the influences of religiosity in this age cohort. Our study examined links between impulsivity, compulsivity, and multiple dimensions of religiosity in a large sample of university students using a voluntary, anonymous Internet-based survey. We hypothesized that religiosity (specifically, the frequency of religious behaviors performed in a group or social setting) would be associated with lower trait impulsivity, lower trait compulsivity, and lower rates of nonsubstance or "behavioral" addictions (gambling disorder, compulsive sexual behavior, and binge eating disorder).[20]

Methods

Survey design

The Department of Psychiatry and Behavioral Neuroscience at the University of Chicago and Boynton Health at the University of Minnesota jointly developed the *Health and Addictive Behaviors Survey* to assess mental health and well-being in a large sample of university students. The survey included basic demographics as well as questions from a number of validated screening tools examining mental health and psychological well-being. All study procedures were carried out in accordance with the Declaration of Helsinki and were approved by the Institutional Review Board of the University of Minnesota.

Participants

A subsample of 10 000 undergraduate and graduate students at a large, nondenominational, and coeducational Midwestern university were chosen by random, computer-generated selection from a total pool of approximately 60 000 students at the university. The survey was distributed over a 3-week period during the fall 2016 semester, with invitations sent by email and surveys completed online. Emails to students were sent out through the system, and we sent out 6 reminder emails. Survey results were downloaded, and all identifiers stripped prior to analysis. Of the 10 000 email invitations, 9449 were successfully received by the recipients. Recipients were first required to view the Institutional Review Board (IRB)-approved online informed consent page, at which point students could choose to participate in the survey or opt out. The survey asserted that all information was confidential. Compensation was offered at the conclusion of the survey by randomly prize drawings. Students were informed that those completing the survey would be entered into a prize drawing whereby 10 students would be randomly chosen to receive prizes: 3 would win tablet computers,

4 would win $250 gift certificates, 2 would win $500 gift certificates, and 1 would win a $1000 gift certificate. Participants were assured that their contact details for the prize draw would be stored completely separately from their survey responses, in order to ensure that their responses were kept completely confidential. Of the 9449 students who received the invitation to participate, 3659 (38.7%) completed the survey. The Office of Institutional Research (OIR) provided us with the random sample. The general policy at the university is to only allow a sample size of no more than 5000. We received a special permission to survey 10 000 students. The survey was administered through the University of Minnesota Qualtrics software system.

Assessments

The self-report survey consisted of 156 questions and took approximately 30 minutes to complete. Survey questions assessed demographic information (including religious affiliation), self-reported academic achievement (ie, grade point average [GPA]), and mental health and substance use.

In order to assess other aspects of mental health function and religiosity, participants were also asked to complete the following measures.

Religiosity was assessed using the *Duke University Religion Index (DUREL)*. The DUREL is a valid and reliable, 5-item measure of religious involvement across 3 domains: organizational religious activity (ORA), nonorganizational religious activity (NORA), and intrinsic or subjective religiosity (IR).[21] The ORA domain assesses the frequency of participation in religious services (1 = *never* to 6 = *more than once/week*). The NORA domain measures the extent of involvement in private religious activities, such as prayer or the study of religious texts (1 = *rarely or never* to 6 = *more than once a day*). The IR domain (3 items) assesses the degree to which the participant is motivated by or committed to his or her religion (1 = *definitely not true* to 5 = *definitely true of me*). Higher scores reflect greater religiosity. The DUREL demonstrated good internal consistency in our sample (Cronbach $\alpha = 0.924$).

Putative disorders of impulse control were screened for using the *Minnesota Impulsive Disorders Interview (MIDI)*. The MIDI screens for a range of impulse control disorders such as gambling disorder, intermittent explosive disorder, kleptomania, pyromania, binge eating disorder, and compulsive sexual behavior.[22] Due to the overall length of the survey, we only included those impulse control disorders which we felt would yield some positive responses among college students and those included gambling disorder, binge eating disorder, and compulsive sexual behavior.

Alcohol use behaviors and related problems were assessed using the *Alcohol Use Disorders Identification Test*. Each item is scored from 0 to 4, with a maximum of 40 points possible. A score of 8 or greater indicates hazardous or harmful alcohol use.[23]

Problematic substance use was identified using the *Drug Abuse Screening Test*. A score of 3 is used to screen for a drug use disorder.[24,25]

Depressive symptoms were measured using the *Patient Health Questionnaire (PHQ-9)*. The PHQ-9 is based directly on DSM-IV-TR criteria for major depressive disorder.[26]

Posttraumatic stress disorder (PTSD) was screened for using the *Primary Care PTSD Screen (PC-PTSD)*. The PC-PTSD is based on DSM-IV PTSD criteria.[27] A score of ≥3 indicates probable PTSD.

Generalized anxiety disorder was screened for using the *Generalized Anxiety Disorder 7 (GAD-7)*. Total scores of 10 or greater indicate clinically significant anxiety.[28]

Attention-deficit/hyperactivity disorder (ADHD) was screened for using the *Adult ADHD Self-Report Scale (ASRS-v1.1).* The ASRS has demonstrated strong psychometric properties.[29]

Global feelings of self-worth or self-regard were measured using the *Rosenberg Self-Esteem Scale.* Scores below 15 suggest low self-esteem.[30]

Impulsivity was assessed using the *Barratt Impulsiveness Scale, Version 11 (BIS-11).* The BIS-11 is a 30-item measure designed to assess impulsivity across 3 dimensions: attentional (inability to concentrate), motor (acting without thinking), and nonplanning (lack of future orientation).[31,32] Each of the 30 items is rated on a 4-point scale of 1 (*rarely/never*) to 4 (*almost always*), where 4 indicates greater impulsiveness.

Compulsive traits were measured using the Cambridge-Chicago Compulsivity Trait Scale (CHI-T). The scale has shown excellent psychometric properties, with high internal consistency (Cronbach's $\alpha = 0.8$), excellent convergent validity against gold-standard assessments for a variety of compulsive disorders (each $P < .001$ for gambling disorder, obsessive-compulsive disorder, and substance use disorder symptoms), and excellent discriminant validity against other constructs such as depression.[33]

The survey also included semistructured questions regarding the use of a range of illicit drugs, caffeine, and sexual behavior. These were not included in this analysis, but are detailed in a previous publication.[34]

Data analysis

Only respondents with complete data on at least one of the DUREL subscales were included in the analyses (N = 3564; 99.8%). Total scores for each of the 3 subscales (ORA, IR, and NORA) were transformed to standardized z-scores, and participants were categorized based on the level of religiosity: low ($z < −1$) or high ($z > +1$). Scores were dichotomized to allow for ease of interpretation. Participants not scoring in these ranges played no further role in the analysis. When we included gender, race, and relationship status in the adjusted analysis, then ORA n = 1667 and IR n = 1694. Distributions of the third score (NORA) did not permit this approach and so we focused on the two for which we had adequately large samples of students with low and high. The 2 subscales were compared on demographic and clinical measures using independent sample t-tests for continuous variables (or equivalent nonparametric tests, as indicated in the text) and chi-square tests for categorical variables. Effect sizes were calculated for all significant differences, which were determined for the likelihood-ratio test using Cramer's V ($V = 0.1$ is considered a small effect size, 0.3 is medium, and 0.5 is large).[35] Continuous variables were tested for statistical difference using F-test and Cohen's d for effect size, and the effect sizes of 0.02, 0.15, and 0.35 are termed *small*, *medium*, and *large*, respectively.[35] Final analysis for categorical predictors was performed using binary logistic regression adjusting for gender, race, and relationship status. Univariate analysis was conducted on the continuous variables also adjusting for gender, race, and relationship status. SPSS (version 27; IBM, Armonk, NY) was used for all statistical analyses. Statistical significance was defined as $P \leq .01$ to account for multiple comparisons.

Missing data were missing completely at random (MCAR), and the analysis was conducted using listwise deletion. Because this was a large sample, where power was not an issue, the assumption of MCAR was satisfied and listwise deletion was thus appropriate.

Results

The demographic characteristics of the entire sample of 3572 participants (57.1% female) are presented in Table 1. Overall, the mean ORA score was 2.52 (1.49), the mean NORA score was 1.98 (1.51), and the mean IRA score was 7.66 (4.17). Participants with high ORA and high IR showed similar patterns in terms of demographics. That is, they were more likely to be female, married, or engaged, and identify as Catholic, Muslim, Protestant, or "other Christian" than those with low ORA or IR. GPA did not differ based on religiosity. As there may be some question as to the honesty of students reporting GPA, we examined as part of a different study (data not reported here) we compared self-report GPA in a survey to their official GPA reported from OIR (eg, self-report mean = 3.6154; official mean = 3.6116). These data allow us to be generally confident in the GPA results.

In terms of mental health, the data are presented in Table 2. After adjusting for gender, race, and relationship status, participants who scored high on ORA and IR were significantly less likely to have alcohol or drug problems and less likely to have low self-esteem. In addition, those with high ORA were significantly less likely to screen positive for PTSD, and those with high IR were significantly less likely to screen positive for binge eating disorder.

Finally, although participants with higher levels of ORA and IR did not differ significantly on a measure of compulsivity from those with lower levels, they did significantly differ in 2 domains of impulsiveness, attentional and nonplanning impulsiveness (Table 3).

Discussion

This study examined 2 aspects religiosity and their links with mental health with a particular focus on impulsive and compulsive tendencies. The 2 aspects of religiosity examined were organizational religiosity (the propensity to attend and engage with formal religious services) and intrinsic religiosity (the propensity to integrate religion into one's life endeavors).[36] We focused on a large sample of university students and the possible associations between religiosity and a range of demographic/clinical measures, and questionnaire-based measures of impulsivity. We found that students who scored high on either types of religiosity were less impulsive, had better self-esteem, and were less likely to have alcohol or drug problems. These results seem generally in keeping with previous examinations of religiosity in young adults. In a previous study using the DUREL in a small sample of 93 patients with mental illness who had attempted suicide and 61 healthy individuals, Caribé et al[37] found that the healthy individuals scored higher scores in the religiosity domains, and this was associated with lower scores on the BIS impulsiveness scale. Similarly, a study of 448 students in Iran found that those who engaged more often in organized religious activities and had higher intrinsic religiosity were less likely to engage in risky behaviors such as sexual risk taking, careless driving, violence, smoking, and alcohol and drug abuse.[38]

The links between religiosity and other measures in the current study were generally of small effect size, which would be in keeping with prior cross-sectional research in other areas of mental health[39] including more recent longitudinal work.[40] However, the one finding in this study that demonstrated a moderate effect size was that higher religiosity was associated with less attentional impulsiveness. This BIS subscale reflects a tendency to have rapid

Table 1. Demographics of University Students Based on Level of Religiosity[a]

	Organizational religious activity			Intrinsic religiosity		
	z-score < −1.00 N = 1338	z-score > 1.00 N = 450	Statistic	z-score < −1.00 N = 958	z-score > 1.00 N = 867	Statistic
Gender						
Male	516(41.1)	170(40.3)	LR = 11.789 df = 2 P = .003 V = .073	373(41.8)	261(32.2)	LR = 29.093 df = 2 P < .001 V = .129
Female	704(56.0)	250(59.2)		494(55.4)	543(67.0)	
Transgender, genderqueer, or alternative descriptor	37(2.9)	2(0.5)		25(2.8)	7(0.9)	
Religious affiliation						
Agnostic	352(26.3)	1(0.2)	LR = 1129.31 df = 11 P = .000 V = .770	240(25.1)	8(0.9)	LR = 1573.25 df = 11 P < .001 V = .829
Atheist	369(27.6)	2(0.4)		358(37.4)	4(0.5)	
Buddhist	17(1.3)	2(0.4)		11(1.1)	11(1.3)	
Catholic	44(3.3)	100(22.2)		27(2.8)	172(19.8)	
Hindu	13(1.0)	2(0.4)		1(0.1)	16(1.8)	
Jewish	8(0.6)	3(0.7)		12(1.3)	9(1.0)	
Muslim	12(0.9)	28(6.2)		1(0.1)	51(5.9)	
Protestant	8(0.6)	123(27.3)		2(0.2)	193(22.3)	
Other Christian	61(4.6)	144(32.0)		13(1.4)	289(33.3)	
Other	119(8.9)	2(0.4)		56(5.8)	19(2.2)	
Chose more than one religion	225(16.8)	39(8.7)		172(18.0)	83(9.6)	
Prefer to not answer	110(8.2)	4(0.9)		65(6.8)	12(1.4)	
Student status						
Undergraduate	885(66.1)	290(64.4)	LR = 1.00 df = 2 P = .606 V = .024	640(66.8)	548(63.2)	LR = 4.976 df = 2 P = .083 V = .052
Graduate/professional	446(33.3)	156(34.7)		315(32.9)	311(35.9)	
Nondegree seeking	7(0.5)	4(0.9)		3(0.3)	8(0.9)	
Race/ethnicity, Caucasian	913(72.7)	282(66.7)	LR = 5.604 df = 1 P = .018 V = .058	685(76.8)	599(73.8)	LR = 2.093 df = 1 P = .148 V = .035
Relationship status						
Single	578(43.2)	231(51.3)	LR = 62.905 df = 3 P = .000 V = .186	394(41.1)	414(47.8)	LR = 59.713 df = 3 P < 0.001 V = .180
Dating	578(43.2)	110(24.4)		441(46.0)	265(30.6)	
Engaged/married	169(12.6)	106(23.6)		111(11.6)	182(21.0)	
Other	13(1.0)	3(0.7)		12(1.3)	6(0.7)	
College GPA						
Below 2.50	26(2.0)	5(1.1)	LR = 4.647 df = 3 P = .200 V = .051	18(1.9)	11(1.3)	LR = 1.435 df = 3 P = .697 V = .028
2.50-2.99	120(9.1)	36(8.2)		78(8.2)	69(8.0)	
3.00-3.49	452(34.2)	135(30.6)		325(34.2)	286(33.3)	
3.50-4.00	725(54.8)	265(60.1)		528(55.6)	492(57.3)	

Note: Data refer to N (percentage), LR = likelihood ratio, and *V* = Cramer's V.
Abbreviation: GPA, grade point average.
[a]Measured by the Duke University Religion Index.

shifts in attention, to have difficulties in task focus, and to become impatient with complexity.

The fact that religiosity was not associated with compulsivity is a novel finding, contrary to our predictions, and is in contrast to the link found with impulsivity. These results may suggest that people with high religiosity are less likely to engage in impulsive acts on the spur of the moment (eg, early stages of alcohol use or gambling), but are just as likely to develop habitual repetitive behaviors over time after initially engaging in these activities. It is interesting to consider how this may reflect the focus of several mainstream religions on often complete avoidance of certain addictive substances and behaviors (eg, alcohol and gambling). Does this reflect our innate tendency to develop habits irrespective of religiosity, whereas avoiding early stages of potentially problematic behavior is

Table 2. Mental Health Problems of University Students Based on Level of Religiosity[a] (Adjusted for Gender, Race, and Relationship Status)

	Organizational religious activity			Intrinsic religiosity		
	z-score < −1.00 N = 1338	z-score > 1.00 N = 450	Statistic	z-score < −1.00 N = 958	z-score > 1.00 N = 867	Statistic
PHQ9-major depression disorder[b]	69(5.4)	12(2.9)	Exp(B) = 1.960 CI = (1.044, 3.681) P = .036	54(6.0)	33(4.1)	Exp(B) = 0.656 CI = (0.417, 1.034) P = .069
PC-PTSD[c]	212(16.6)	44(10.3)	Exp(B) = 1.749 CI = (1.224, 2.500) P = .002	137(15.0)	106(12.9)	Exp(B) = 0.807 CI = (0.608, 1.072) P = .807
Generalized anxiety disorder[d]	232(18.5)	57(13.6)	Exp(B) = 1.441 CI = (1.043, 1.989) P = .027	168(18.6)	130(16.0)	Exp(B) = 0.807 CI = (0.622, 1.048) P = .108
Compulsive sexual behavior	46(3.7)	14(3.3)	Exp(B) = 1.001 CI = (0.539, 1.857) P = .998	32(3.6)	26(3.2)	Exp(B) = 1.086 CI = (0.631, 1.863) P = .766
Binge eating disorder	37(2.9)	8(1.9)	Exp(B) = 1.738 CI = (0.795, 3.802) P = .166	28(3.1)	11(1.3)	Exp(B) = 2.653 CI = (1.297, 5.426) P = .008
ADHD	241(19.1)	62(14.6)	Exp(B) = 1.387 CI = (1.018, 1.890) P = .038	174(19.4)	120(14.8)	Exp(B) = 1.349 CI = (1.038, 1.753) P = .025
Gambling disorder	5(0.4)	0(0.0)	Exp(B) = 5 002 060.000 CI = (0.000, .) P = .993	2(0.2)	3(0.4)	Exp(B) = 0.502 CI = (0.083, 3.089) P = .453
Low self-esteem[e]	213(17.1)	45(10.8)	Exp(B) = 0.558 CI = (0.393, 0.793) P = .001	156(17.7)	83(10.5)	Exp(B) = .506 CI = (0.378, .679) P = .000
AUDIT score < 8	335(25.3)	36(8.1)	Exp(B) = 3.680 CI = (2.540, 5.333) P = .000	238(25.1)	150(17.5)	Exp(B) = 1.544 CI = (1.215, 1.962) P = .000
DAST-10 score < 3	142(10.8)	12(2.7)	Exp(B) = 3.948 CI = (2.159, 7.219) P = .000	95(10.1)	43(5.0)	Exp(B) = 1.907 CI = (1.299, 2.799) P = .001

Note: Data refer to N (percentage), Exp(B) = odds ratio, CI = 95% confidence interval, and P = P-value.
Abbreviations: ADHD, attention-deficit/hyperactivity disorder; AUDIT, Alcohol Use Disorders Identification Test; DAST-10, Drug Abuse Screening Test; GAD-7, General Anxiety Disorder-7; PC-PTSD, Primary Care PTSD Screen; PHQ-9, Patient Health Questionnaire; RSES, Rosenberg Self-Esteem Scale.
[a]Measured by the Duke University Religion Index.
[b]PHQ-9 score ≥ 10.
[c]PC-PTSD score ≥ 3.
[d]GAD-7 score ≥ 10.
[e]RSES score < 15.

Table 3. Impulsivity and Compulsivity of University Students Based on Level of Religiosity[a] (Adjusted for Gender, Race, and Relationship Status)

	Organizational religious activity			Intrinsic religiosity		
	z-score < −1.00 N = 1338	z-score > 1.00 N = 450	Statistic contrast test results	z-score < −1.00 N = 958	z-score > 1.00 N = 867	Statistic contrast test results
CHI-T	9.88(13.73)	8.41(13.13)	$F(1, 1622) = 3.502; P = .061$	9.81(13.58)	8.26(13.17)	$F(1, 1689) = 6.745; P = .009$
BIS-11						
Attentional impulsiveness	16.69(4.07)	15.26(3.83)	$F(1, 42.074) = 42.074; P = .000$	16.74(4.22)	15.48(3.85)	$F(1, 1660) = 45.88; P = .000$
Motor impulsiveness	20.45(4.00)	20.02(4.12)	$F(1, 1633) = 4.784; P = .029$	20.21(3.99)	20.24(4.14)	$F(1, 1662) = 0.085; P = .771$
Nonplanning impulsiveness	23.27(4.88)	22.21(4.46)	$F(1, 1625) = 17.302; P = .000$	22.99(4.87)	22.29(4.74)	$F(1, 1659) = 10.768; P = .001$

Note: Data refer to mean (standard deviation).
Abbreviations: BIS-11, Barratt Impulsiveness Scale, Version 11; CHI-T, Cambridge–Chicago Compulsivity Trait Scale.
[a]Measured by the Duke University Religion Index.

something we are more able to do and this is aided by religious frameworks?

In terms of mental health problems, we found that higher levels of religiosity were significantly associated with higher self-esteem and, in the case of organized religion, with lower levels of PTSD. Thus, our findings add to growing evidence of the potential small effect size protective factors of religiosity in young people. A study of Veterans similarly found that PTSD was less likely in those with greater religiosity.[41] This finding could be explained by the sense of purpose and community that organized religion instills in some people, or it could be an indirect effect. That is, those with higher organizational religiosity also had better self-esteem, were less impulsive, and were less likely to have alcohol and drug problems. Given that PTSD has been associated with alcohol and drug problems,[42] and that less impulsive people may be less likely to have traumatic situations,[43] multiple interacting variables may explain the lower rates of PTSD in those who are more religious.

This study of religiosity in young adults has the advantage of being relatively large. Nonetheless, there are several limitations that should be considered. The study was cross-sectional, and hence the direction of causality of any effects cannot be established—this would require longitudinal research on the topic; however, we hope that such cross-sectional data will encourage such follow-up. Given that associations were generally of small effect size, we did not attempt to examine mediation between variables. There are limitations inherent in the study being conducted using an online interface via the Internet—diagnostic assessment may be less accurate via such an online survey compared to in-person assessment by a clinician; there may be responder biases; and there may be under-reporting (although this possibility is reduced by individuals' responses not being lacked to personally identifiable information). Our splitting of the sample into those with high and low religiosity was a useful way of presenting the data since it is intuitive to the reader; however, of course, there are other ways of operationalizing high and low religiosity that could be used. Finally, our choice of North-American university students and its intrinsic features to test hypotheses about young adults and religiosity may not generalize to young adults globally.

Conclusion

We found that higher levels of religiosity in university students were associated with lower rates of impulsivity (medium effect size) as well as relatively higher levels of mental health (small effect size), but not with different levels of compulsivity. Whether religiosity leads to being less impulsive or vice versa, both, or the link can be accounted for by other variables, remains unclear. The link with impulsive traits may indicate less propensity of people with high religiosity to spontaneously undertake or engage with potentially harmful activities (eg, alcohol or gambling), but that once initiated, there is a similar tendency to get stuck in a given habitual pattern as compared to people with low levels of religiosity.

Author contributions

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