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Losing Faith and Finding Religion: Religiosity over the life course and substance use and abuse

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Abstract

Background—Religion has only come into the light of scientific inquiry as a factor influencing health and behavior in the last few decades. While religiosity is a protective factor for contemporaneous substance misuse, the relationship between longitudinal changes in religiosity and substance use outcomes is understudied.

Methods—Using data from the National Comorbidity Study–Replication (N=6203), we examined how changes in religiosity from childhood to adulthood are related to use and abuse/dependence of licit (alcohol and tobacco) and illicit drugs. Multivariable logistic regression was used to account for potential confounders including demographic characteristics, familial disruption during childhood, and comorbid major depression.

Results—Religiosity was inversely associated with use and misuse of both licit and illicit substances, however this relationship varied by level of childhood religiosity. Relative to stable levels of religiosity from childhood to adulthood, a 2-unit decrease in religiosity from childhood was associated with increased likelihood of illicit drug use in the past year (Odds ratio (OR):2.43, 95% Confidence Interval (CI):1.39–4.25). However, a 2-unit increase in religiosity was also associated with past-year illicit drug use (OR:1.85, 95% CI:1.09–3.13). Comparable associations were found with a range of recent and lifetime measures of alcohol, tobacco, and illicit drugs.

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Contributors
Authors Moscati and Mezuk designed the study. Author Moscati conducted literature searches and wrote the first draft of the manuscript. All authors contributed to and approved the final manuscript.

Conflict of Interest
The authors have no conflict of interest.

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Conclusions—Substantial gains or losses in religiosity from childhood to adulthood are associated with substance use and misuse. Findings support the use of a life course approach to understanding the relationship between religiosity and substance use outcomes.

Keywords

Religiosity; Alcohol; Tobacco; Cannabis; Drugs; Dependence

1. INTRODUCTION

Religion, perhaps due to its nature as an intensely personal, subjective, and controversial topic, is sometimes viewed as a domain distinct from scientific inquiry, even in opposition to it. While certain historical conceptions of psychopathology invoked spiritual causes, such as hallucinations treated as visions from the saints in the Middle Ages (Kroll and Bachrach, 1982), and mental illnesses equated with possession in traditional Arab culture (Al-Adawi et al., 2002), modern empirical investigation of religion as a determinant of mental health and related behaviors is relatively novel. Although one of the earliest reports on church attendance and child delinquency reported null results (Hirschi and Stark, 1969), most subsequent studies indicate that religious involvement is generally protective for both licit and illicit substance use (Yonker et al., 2012). Indeed, in a nationwide study Stark (1996) revisited the topic, finding religious attendance protective against alcohol and drug use. Church attendance is only one index of religious behavior that may be relevant to substance use outcomes, however.

Measures of religiosity, that is, the salience of religious belief to a person's life, have not yet been standardized to any significant degree. Efforts to categorize this heterogeneity have arrived at diverse factor-analytic (Kendler et al. 2003) or meta-analytic distinctions (Chitwood et al., 2008). Two broad notions of religiosity have been primarily applied: first, a quality called *organizational religiosity*, which indexes participation in social religious activities; and second, a quality termed *intrinsic religiosity*, which indexes the perceived importance of religion. Both these metrics of religiosity have been negatively associated with alcohol and cannabis use, and less strongly, tobacco use and other illicit substances as well (Edlund et al., 2010; Kovacs et al., 2011; Marsiglia et al., 2012). A latent class analysis of both organizational and intrinsic indices among adolescents found that protective effects were most pronounced in the 'devoted' class (i.e., high levels on both metrics), though findings were less clear for other classes (Salas-Wright et al., 2012). The relationship between organizational religiosity and substance use is complex (Marsiglia et al., 2012); indeed, in cases where intrinsic religiosity is low, greater attendance of religious services and activities is associated with elevated risk of substance use (Longest and Vaisey, 2008).

Many indices of organizational religiosity assess objective measures of religious behavior (e.g., frequency of attendance). However, external forces may influence these behaviors: for example, lack of nearby worship centers may reduce the frequency that one attends services, or a friend or family member may attempt to increase that frequency (particularly for children who receive their religious proclivities from their parents). If religiosity, rather than a volitional expression of faith, is instead the result of external factors, it may not serve well as a protective factor for substance use and misuse. This suggests that instead an

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examination of intrinsic religiosity may provide a more consistent picture of the effects of religious belief.

While a handful of longitudinal studies have examined religiosity and its relationship with substance use (Yeung et al., 2009), in most cases religiosity is treated as time-invariant. Many of the instruments used to assess religiosity [e.g., the Duke University Religion Index (Koenig and Büssing, 2010)] assess only current religious involvement and belief. These measures thus provide little information about the development of religiosity over a person's life course. One notable exception comes from a longitudinal study of adolescents by Regnerus and Burdette (2006). Over a one-year period, they reported that approximately 15% of adolescents reported growth in at least one measure of religiosity, 20% reported a decline, and the remaining 65% experienced no change; declines in religiosity were positively correlated with substance use behaviors. As this study indicates, religiosity can be conceptualized like other dynamic personal qualities, such as attitudes towards political engagement, which change over time (Eckstein et al., 2012). It is therefore possible that change in religiosity itself may act as a risk or protective factor distinct from the absolute level of religious involvement.

The goal of this investigation is to bring the connections between changes in religiosity over the life course and substance use and misuse into greater clarity. To this end, we examined the relationship between change (both gains and losses) in religiosity and substance use and abuse/dependence using data from a nationally-representative sample of US adults.

2. METHODS

2.1. Data

Data come from the National Comorbidity Survey–Replication (NCS-R). The NCS-R is a nationally-representative, household survey of adults aged 18 and older conducted between 2001 and 2003 (Kessler and Merikangas, 2004). The NCS-R collected information on a variety of psychiatric and substance use conditions through the World Health Organization Composite International Diagnostic Interview (WHO-CIDI) instrument. The WHO-CIDI is a fully-structured diagnostic instrument administered by layperson trained interviewers, modeled after a clinical psychiatric interview, and is designed to assess psychiatric and substance use disorders as categorized in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) and the International Classification of Diseases (ICD-10). Only those respondents who provided complete data on the measures of intrinsic religiosity and substance abuse/dependence (N=6203) (both asked in Part 2 of the NCS-R interview only) were included (66.8% of the total NCS-R sample). Appropriate data weights, along with strata and cluster variables, were used to allow this subsample to be properly representative of the US population.

2.2 Variables

Key Predictors—The two main predictors were childhood and current (adulthood) intrinsic religiosity. Respondents were asked "In general, how important are religious or spiritual beliefs in your daily life–very important, somewhat, not very, or not at all important?" and then asked, "How important was religion in your life when you were

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growing up–very important, somewhat, not very, or not at all important?" Both items were measured on a 4-point scale ranging from 1 ("Very important") to 4 ("Not at all important"). Change in religiosity was calculated by subtracting religiosity in adulthood from that in childhood, such that a positive change score indicates an increase in religiosity in adulthood relative to childhood. Change in religiosity was categorized as: No change, Slight change (corresponding to a one-point difference), Moderate change (a two-point difference) and Significant change (a three-point difference). Positive and negative changes were analyzed separately to allow for the two types of change having different associations with the substance use outcomes. We note that 'change' refers simply to having endorsed a level of childhood religiosity different from the reported current religiosity, and is described as positive (or a 'gain') if the current level exceeds the childhood level – meaning that those who experience gains necessarily start from lower religiosity levels in childhood. Religious preference was categorized as Protestant, Catholic, Other religious preference, and No preference (including Agnostic, Atheist, and those reporting no religious preference/no religion). Notably, no distinct categories for affiliations of relevance to substance use were present in this data (such as Mormonism, Islam, Buddhism, and Sikhism); instead such responses (if any) were included in the 'other' group. Differences between Pentecostal Protestants and others were considered, but no significant effects of religious preference arose when these categories were analyzed separately (data not shown). Frequency of attending services, a measure of organizational religiosity, was also assessed, categorized as "More than once a week" "About once a week," "One to three times a month," "Less than, once a month," or "Never."

Outcomes—Current or recent use of alcohol, tobacco, cannabis, cocaine, prescription drugs (in a non-prescribed fashion), and other illicit substances was assessed by self-report. Current alcohol use was assessed as past-year frequency of having at least one drink, dichotomized as 3 or more occasions per week on average versus drinking less often. Lifetime alcohol abstainers (N = 364) were excluded from this analysis due to probable qualitative differences between this group and those who merely drink infrequently, though as a sensitivity analysis all alcohol use models were refit including abstainers; results were substantially unchanged (data not shown). Current smoking behavior was dichotomized as current versus former/never smoker. Recent drug use was dichotomized as past-year use of marijuana, cocaine, prescription drugs, or other illicit drugs, versus not. Past-year alcohol abuse and dependence were assessed using the CIDI according to DSM-IV criteria and combined into a single dichotomous variable. Past-year nicotine dependence was also assessed according to DSM-IV criteria. Finally, abuse and dependence of any illicit drug was combined into a single variable indicating past-year DSM-IV drug abuse/dependence. CIDI diagnoses of substance abuse/dependence have good concordance with clinical interviews, such as the clinician-administered World Health Organization Schedules for Clinical Assessment in Neuropsychiatry (SCAN; Cottler et al., 1989; Compton et al., 1996). In total, six recent substance use and misuse variables were constructed: early alcohol use, lifetime tobacco use, lifetime illicit drug use, lifetime alcohol abuse/dependence, lifetime nicotine dependence, and lifetime drug abuse/dependence.

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Six variables were also constructed for lifetime substance use. Because almost all respondents had tried alcohol at least once (94.1%), initiation of alcohol use was dichotomized as early (age of first use younger than or at age 15; the mean age of initiation in the NCS-R) versus later adopters. Lifetime tobacco use was dichotomized as ever (current/former) smoker versus never tobacco use. Lifetime use of any illicit drug was combined into a single dichotomous variable of ever versus never use; approximately half (46.7%) of respondents who endorsed using an illicit drug had used cannabis only. Finally, lifetime alcohol abuse/dependence, nicotine dependence, and illicit drug abuse/dependence were each dichotomized into having ever met criteria versus never.

Other covariates—Demographic and socioeconomic characteristics were assessed by self-report. Age was treated as a continuous variable. Race/ancestry was categorized as Non-Hispanic White (reference), Non-Hispanic Black, Hispanic, Asian, and other. Educational attainment was categorized as 0–11 years, 12 years, 13–15 years, and 16+ years (reference). Marital status was categorized as married/cohabiting (reference),divorced/separated/ widowed, and never married. Two additional variables were also included as covariates: early family disruption and comorbid major depression. Early family disruption was indexed by a dichotomous variable that indicated whether or not the participant lived with both biological parents until age 18. Lifetime DSM-IV major depressive episode (MDE) was assessed using the CIDI.

2.3 Analysis

Initially, the relationship between religiosity and the covariates was examined using chi-squared tests for categorical variables and ANOVA F-tests for continuous variables. Next, each of the four religiosity variables (a) intrinsic religiosity in childhood; (b) intrinsic religiosity in adulthood; (c) gains in religiosity over time; and (d) loss in religiosity over time were examined as predictors of recent substance use and misuse using logistic regression. Models were adjusted for age, sex, race/ancestry, education level, marital status, early family disruption and MDE. These analyses were repeated for the lifetime substance use and misuse measures. We also conducted parallel analyses of absolute change as a continuous predictor of both lifetime and recent substance use outcomes (to determine the overall effect of a one unit change, either positive or negative).

All analyses were conducted using SPSS 21 accounting for the complex sampling design. All p-values refer to two-tailed tests and statistical significance was set at $p<0.05$. The NCS-R is approved by the Institutional Review Board of the University of Michigan and all participants provided informed consent.

3. RESULTS

Overall, 972 (18.2%) reported decline in religiosity from childhood to adulthood, 1,525 (28.6%) reported a gain in religiosity, and the remaining 2,841 (53.2%) reported stable religiosity. Women, non-Hispanic Blacks, and Protestants reported the highest levels of religiosity relative to other groups. Religiosity did not vary by education, family disruption during childhood, or history of major depression (Table 1).

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We first examined the relationship between religiosity in adulthood and in childhood, separately, and substance use and abuse/dependence (Table 2 shows this analysis for current substance use/misuse, and Table 3 displays the results for lifetime use/misuse). Consistent with previous research, low levels of religiosity in adulthood were associated with increased likelihood of frequent past-year alcohol use, being a current smoker, and having used illicit drugs in the past year. Religiosity in both childhood and adulthood were associated with early alcohol use, ever being a smoker, and lifetime illicit drug use (Table 3) though the increased risk was more consistent with low adult religiosity levels. Indeed, in the recent substance use measures low childhood religiosity seemed to be protective against alcohol misuse (both frequent and disordered use) compared with high childhood religiosity. The same pattern was observed for past-year and lifetime substance use disorders, though some associations were not statistically significant due to small cells.

We then examined the relationship between change in religiosity from childhood to adulthood and substance use outcomes. As shown by Figure 1, the relationship between high levels of religiosity in adulthood and alcohol initiation and lifetime abuse/dependence varied as a function of change in religiosity. Relative to individuals who had high religiosity in both childhood and adulthood, those who had a slight or moderate increase in religiosity since childhood had elevated odds of early alcohol initiation (Odds Ratio (OR):1.28, 95% Confidence Interval (CI):1.04–1 .56; OR: 1.54, 95% CI:1.10–2.16 respectively). The same groups were also more likely to have met criteria for alcohol abuse/dependence (OR:1.85, 95% CI:1.41–2.43; OR:2.19, 95% CI:1.46–3.29 respectively). Table 4 shows the relationship between change in religiosity and recent substance use behaviors. Both gains and losses in religiosity over the life course were associated with increased likelihood of many outcomes, although the results were more consistent for declines in religiosity and due to the small number of individuals in some categories the confidence intervals were wider than for the lifetime measures. Relative to individuals who had stable levels of religiosity, individuals who reported a moderate (2-point) decline over the life course were 2.8 times more likely to meet DSM-IV criteria for alcohol abuse/dependence in the last year (95% CI: 1.28–5.98), and 3.5 times more likely to meet criteria for drug abuse/dependence in the last year (95% CI: 1.00–12.01). Gains in religiosity were also associated with elevated odds of substance use/misuse; those who reported a significant increase in religiosity were 2.6 times more likely to meet criteria for alcohol abuse/dependence in the last year (95% CI:1.17–5.78) and twice as likely to have used an illicit drug in the last year (95% CI:1.02–3.82) relative to individuals with stable religiosity.

As shown by Table 5, both gains and losses in religiosity over the life course were also associated with increased likelihood of all lifetime substance use and abuse/dependence outcomes, although the results were again stronger for declines in religiosity. For example, relative to individuals who had the same level of religiosity in childhood and adulthood, individuals who reported a moderate decline (corresponding to a 2-point decline) were 2.5 times more likely to meet DSM-IV criteria for alcohol abuse/dependence (95%CI:1.67–3.70), 2.5 times more likely to meet criteria for nicotine dependence (95% CI:1.45–4.21), and 2.6 times more likely to meet criteria for drug abuse/dependence (95% CI:1.51–4.53). Consistent with the analysis using recent measures, relative to individuals with stable religiosity, those who reported a moderate increase were 2.2 times more likely to meet

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criteria for lifetime alcohol abuse/dependence (95% CI: 1.67–2.96), 1.5 times more likely to meet criteria for lifetime nicotine dependence (95% CI:1.10–2.10), and 2.0 times more likely to meet criteria for lifetime drug abuse/dependence (95% CI:1.42–2.91).

We conducted several sensitivity analyses to assess the robustness of our findings. Models stratified by religious affiliation were generally consistent with the results in the sample overall (data not shown). We also fit absolute (positive or negative) change in religiosity as a continuous variable additionally adjusting for religiosity in adulthood (which is likely an over-adjustment), and the findings were attenuated but broadly consistent with those presented in Tables 4 and 5. For recent measures, two associations retained significance after adjustment, past-year use of illicit drugs (OR:1.38, 95% CI:1.18–1.61) and past-year alcohol disorder (OR:1.34, 95% CI: 1.12–1.61); before adjustment for adult religiosity, past-year nicotine dependence and drug disorder were also significant (OR:1.19, 95% CI:1.04–1.36; OR:1.31, 95% CI:1.03–1.66, respectively). For the lifetime measures, all associations were statistically significant even after adjustment for adult religiosity: early alcohol use (OR:1.12, 95% CI:1.01–1.24), ever been a smoker (OR:1.15, 95% CI:1.05–1.26), illicit drug use (OR:1.21, 95% CI:1.07–1.37), lifetime alcohol abuse/dependence (OR:1.40, 95% CI: 1.26–1.56), lifetime nicotine dependence (OR:1.13, 95% CI:1.02–1.24), and lifetime drug abuse/dependence (OR:1.27, 95% CI:1.11–1.45)

Finally, we analyzed the four most extreme categories of lifetime religiosity: (i) consistently low in childhood and adulthood, (ii) consistently high in childhood and adulthood, (iii) high in childhood but low in adulthood, and (iv) low in childhood but high in adulthood to more fully examine the influence of change vs. stable levels of high or low religiosity (Table 6). As expected, the consistently low group was more likely to begin drinking early, have been a smoker, and to have met criteria for nicotine dependence relative to the more moderate lifetime religiosity groups. The consistently high group, conversely, was buffered from most substance use outcomes. The high-then-low group has results suggestive of increased risk, though none reach significance due to the small size of the group; similarly, the low-then-high group's results may imply a slight protection, but again none reach significance.

4. DISCUSSION

The primary finding from this study is that, notwithstanding the protective effect of intrinsic religiosity at a given point in time, the degree to which the importance of religion changes over the life course is associated with increased likelihood of substance use and misuse. This association was consistent across both licit and illicit substances and similar for both recent and lifetime measures of substance use outcomes.

While intrinsic religiosity at any given period may promote a healthy self-concept, alterations in these beliefs, which are tied to feelings of purpose and meaning in life (Diener et al., 2011), may contribute to a less positive self-concept and concomitant risk behaviors. The effect of declining religiosity may seem straightforward; religiosity is protective, so it is reasonable that reduced religiosity leads to increased risk. However, there may be other factors contributing to the elevated risk of substance use for this group. Due to the fact that our analysis compared childhood religiosity to current religiosity (of an adult sample), we

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may assume that one transition experienced by the majority of the sample was from adolescent to emerging adult. This time of life is associated with increased social, legal and ideological freedom, and many emerging adults seek to separate themselves from their parents 'beliefs; indeed levels of parental religiosity are negatively associated with emerging adult religiosity when confounding variables are held constant (Leonard et al., 2013). This formation of an individual identity, which occurs simultaneously with leaving the family home for the first time for many emerging adults, is a time of increased substance use risk; and while higher religiosity attenuates this increase (White et al., 2006), those who are moving away from their parents' beliefs as well as their homes do not retain this protection. In addition, if the decline is sharp enough, the social support parents provide to their children may be reduced due to incompatible beliefs, especially if the child rejects belief in god entirely; anti-atheist prejudice is widespread, and may introduce distrust into parent-child relationships (Gervais et al., 2011). It is possible that one mechanism contributing to the risk incurred by a decline in religiosity is related to the loss of certain direct and indirect protective factors that comprise the multifactorial construct of intrinsic religiosity, and potentially the reaction to this loss.

The increased risk of substance abuse/dependence disorders observed among those who reported a gain in intrinsic religiosity since childhood might seem counter-intuitive, given the protective influence of religiosity so often reported. Those who develop religiosity in adulthood are presumably doing so of their own volition. It is known, however, that religiosity is positively associated with difficult life circumstances (Diener et al., 2011), and in some of those who experienced a gain in religiosity over the lifespan this increased faith may be related to coping with stressful life events, stimuli that often lead to substance use as well (Wills et al., 2001). Whether sought for life enhancement, coping with difficult circumstances or other reasons, religion is, in certain ways, a habit of thought and may occupy a role in one's life analogous to such behavioral habits as alcohol use; there are many parallels between substance dependence and addictive involvement with religion (Taylor, 2002). The mechanism of an increase in religiosity's contribution to substance risk may therefore relate to tendencies for the reasons a person may seek religion in adulthood to overlap with risk factors for substance use.

We acknowledge that with our data it is not possible to explicitly disentangle the effects of childhood and adult religiosity from the theorized separate effect of a change in religiosity over the life course. However, the sensitivity analyses adjusting for current religiosity, as well as the models focused on those who had the most extreme changes, are consistent with our interpretation that there is indeed an additional effect of change in religiosity. Since religiosity in both adulthood and childhood is protective, we would assume in the absence of such an effect that a group having high religiosity at a point where another has low religiosity, all else being similar between them, would be more protected from substance use outcomes – our findings indicate this is not the case, though more research is needed.

Findings should be interpreted in light of study limitations. Foremost, the temporal relationship between change in religiosity and lifetime substance use/misuse could not be established definitively. Since religiosity was not asked about at a particular age (rather, "while growing up"), it's possible that initiation of a substance or a substance disorder onset

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occurred before the transition of religiosity level, after, or even during this process. Longitudinal data that follows individuals from early adolescence, assessing substance initiation and religious factors at multiple time points are needed to resolve this. The lifetime associations, without certainty on this point, may be partially due to a tendency for substance use to lead to a change in religiosity level. Indeed, in many cases of recovery from substance abuse/dependence, the fostering of religious faith is a prominent ingredient – the well-known Alcoholics Anonymous (AA) organization considers addiction to be as much a spiritual issue as a medical or psychiatric one (Alcoholic Anonymous World Services, 1976). Our analysis of changes in religiosity and more recent substance use, however, lend support for our theorized direction of the relationship. Substance use outcomes were assessed by self-report; however, CIDI diagnoses have good concordance with clinical assessments of substance abuse and dependence (Cottler et al., 1989; Compton et al., 1996). Some of the cells, particularly for the most extreme religiosity change groups, were small as reflected by imprecision in the estimates for these groups. Finally, our means of measuring religiosity limited our ability to adjust for current religiosity while independently estimating the effect of change in religiosity; surveys that included more fine-grained assessment of religious belief, as well as explicit appraisals of whether/how individuals' religious beliefs have shifted would allow for a more nuanced analysis of the effects of religiosity over the life course.

This study also has a number of strengths. Data were drawn from a nationally-representative, population-based sample, mitigating risk of selection bias and enhancing generalizability of findings. We also examined relationships between religiosity and both licit and illicit substance use and abuse/dependence, providing a more comprehensive account of religiosity's effects in this domain. Finally, this study is among the first, to the authors' knowledge, to explicitly examine how change in religious beliefs, apart from absolute level of religiosity, relates to risk of substance use and misuse.

In summary, if these results are replicated, they may be indicative that the protective effect of religious belief on substance use and abuse/dependence is a function of the particular path a person takes in his or her specific spiritual journey. Some paths are well-known, a steady course with a predictable destination, and others are less-traveled, presenting bends and curves which may lead to a new perspective, but also perhaps doubts and challenging experiences along the way.

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References

Al-Adawi S, Dorvlo ASS, Al-Ismaily SS, Al-Ghafry DA, Al-Noobi BZ, Al-Salmi A, Burke DT, Shah MK, Ghassany H, Chand SP. Perception of and attitude towards mental illness in Oman. Int J Soc Psychiatry. 2002; 48:305. [PubMed: 12553410]

Alcoholic Anonymous World Services. Alcoholics Anonymous. 3. New York: 1976.

Burkett SR, White M. Hellfire and delinquency: another look. J Sci Stud Relig. 1974; 13:455–642.

Chitwood DD, Weiss ML, Leukefeld CG. A systematic review of recent literature on religiosity and substance use. J Drug Issues. 2008; 38:653–688.

Compton WM, Cottler LB, Dorsey KB, Spitznagel EL, Mager DE. Comparing assessments of DSM-IV substance dependence disorders using CIDI-SAM and SCAN. Drug Alcohol Depend. 1996; 41:179–187. [PubMed: 8842630]

Cottler LB, Robins LN, Helzer JE. The Reliability of the CIDI-SAM: a comprehensive substance abuse interview. Br J Addict. 1989; 84:801–814. [PubMed: 2758153]

Diener E, Tay L, Myers DG. The religion paradox: if religion makes people happy, why are so many dropping out? J Person Soc Psychol. 2011; 101:1278–1290.

Eckstein K, Noack P, Gniewosz B. Attitudes toward political engagement and willingness to participate in politics: Trajectories throughout adolescence. J Adolesc. 2012; 35:485–495. [PubMed: 21831416]

Edlund MJ, Harris KM, Koenig HG, Han X, Sullivan G, Mattox R, Tang L. Religiosity and decreased risk of substance use disorders: is the effect mediated by social support or mental health status? Soc Psychiat Epidemiol. 2010; 45:827–836.

Gervais WM, Shariff AF, Norenzayan A. Do you believe in atheists? Distrust is central to anti-atheist prejudice. J Person Soc Psychol. 2011; 101:1189–1206.

Hirschi T, Stark R. Hellfire and delinquency. Soc Probl. 1969; 17:202–213.

Kendler KS, Liu X, Gardner CO, McCullough ME, Larson D, Prescott CA. Dimensions of religiosity and their relationship to lifetime psychiatric and substance use disorders. Am J Psychiatry. 2003; 160:496–503. [PubMed: 12611831]

Kessler RC, Merikangas KR. The National Comorbidity Survey Replication (NCS-R): background and aims. Intl J Methods Psychiatr Res. 2004; 13:60–68.

Koenig HG, Büssing A. The Duke University Religion Index (DUREL): a five-item measure for use in epidemiological studies. Religions. 2010; 1:78–85.

Kovacs E, Piko BF, Fitzpatrick KM. Religiosity as a protective factor against substance use among Hungarian high school students. Subst Use Misuse. 2011; 46:1346–1357. [PubMed: 21612341]

Kroll J, Bachrach B. Visions and psychopathology in the Middle Ages. J Nerv Ment Dis. 1982; 170:41–49. [PubMed: 7033474]

Leonard KC, Cook KV, Boyatzis CJ, Kimball CN, Flanagan KS. Parent-child dynamics and emerging adult religiosity: attachment, parental beliefs, and faith support. Psychol Relig Spiritual. 2013; 5:5–14.

Longest KC, Vaisey S. Control or conviction: eligion and adolescent initiation of marijuana use. J Drug Issues. 2008; 38:689–715.

Marsiglia FF, Ayers SL, Hoffman S. Religiosity and adolescent substance use in Central Mexico: exploring the influence of internal and external religiosity on cigarette and alcohol use. Am J Community Psychol. 2012; 49:87–97. [PubMed: 21533659]

Michalak L, Trocki K, Bond J. Religion and alcohol in the U.S. National Alcohol Survey: how important is religion for abstention and drinking? Drug Alcohol Depend. 2007; 87:268–280. [PubMed: 16987610]

Regnerus MD, Burdette A. Religious change and adolescent family dynamics. Sociol Q. 2006; 47:175–194.

Salas-Wright CP, Vaughn MG, Hodge DR, Perron BE. Religiosity profiles of American youth in relation to substance use, violence, and delinquency. J Youth Adolesc. 2012; 41:1560–1575. [PubMed: 22476727]

Stark R. Religion as context: hellfire and delinquency one more time. Sociol Relig. 1996; 57:163–173.

NIH-PA Author Manuscript

NIH-PA Author Manuscript

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Taylor CZ. Religious addiction: obsession with spirituality. Pastoral Psychol. 2002; 50:291–315.

Turiano NA, Whiteman SD, Hampson SE, Roberts BW, Mroczek DK. Personality and substance use in midlife: conscientiousness as a moderator and the effects of trait change. J Res Person. 2012; 46:295–305.

White HR, McMorris BJ, Catalano RF, Fleming CB, Haggerty KP, Abbott RD. Increases in alcohol and marijuana use during the transition out of high school Into emerging adulthood: the effects of leaving home, going to college, and high school protective factors. J Stud Alcohol. 2006; 67:810–822. [PubMed: 17060997]

Wills TA, Sandy JM, Yaeger AM, Cleary SD, Shinar O. Coping dimensions, life stress, and adolescent substance use: a latent growth analysis. J Abnorm Psychol. 2001; 110:309–323. [PubMed: 11358025]

Yeung JWK, Chan Y, Lee BLK. Youth, religiosity and substance use: a meta-analysis from 1995 to 2007. Psychol Rep. 2009; 105:255–266. [PubMed: 19810452]

Yonker JE, Schnabelrauch CA, DeHaan LG. The relationship between spirituality and religiosity on psychological outcomes in adolescents and emerging adults: a meta-analytic review. J Adolesc. 2012; 35:299–314. [PubMed: 21920596]

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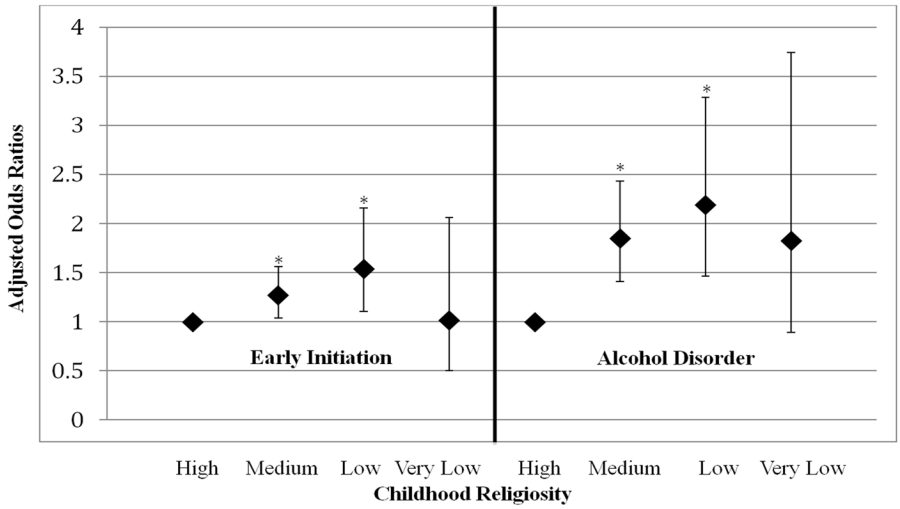

Figure 1.

Relative odds of early alcohol initiation and alcohol abuse/dependence by levels of religiosity in childhood among respondents who reported high levels of religiosity in adulthood (N = 3146)

Estimates adjusted for age, sex, race/ancestry, marital status, education, living with both parents until age 18 and lifetime major depressive episode.

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Table 1

Demographic characteristics of the sample, in relation to religiosity in adulthood

	Overall N (wt%)	High Religiosity N (wt%)	Moderate Religiosity N (wt%)	Low Religiosity N (wt%)	Very Low Religiosity N (wt%)	χ^2 or F, df, p-value
Age (Mean, SE)	45.0 (0.2)	48.3 (0.3)	41.9 (0.4)	39.7 (0.7)	38.8 (0.8)	88.1, 3, <.001
Gender						
Male	4139 (47.0)	1322 (48.3)	872 (29.3)	374 (12.3)	304 (10.1)	139.5, 3, <.001
Female	5143 (53.0)	2266 (61.7)	987 (26.0)	292 (7.6)	197 (4.7)	
Ancestry/Race						
Non-Hispanic White	6696 (72.8)	2455 (51.5)	1441 (29.2)	565 (11.2)	419 (8.2)	
Non-Hispanic Black	1230 (12.4)	611 (75.0)	150 (18.6)	21 (3.0)	24 (3.4)	
Hispanic	883 (11.1)	352 (59.5)	177 (27.3)	51 (8.6)	29 (4.6)	168.5, 12, <.001
Asian	189 (1.7)	47 (44.7)	28 (25.5)	18 (14.9)	14 (14.9)	
Other	284 (2.1)	123 (61.2)	63 (27.3)	11 (5.8)	15 (5.8)	
Marital Status						
Married	5322 (56.0)	2286 (57.6)	1175 (26.9)	410 (9.2)	283 (6.3)	
Divorced/ Separated	2017 (20.8)	783 (64.0)	282 (23.3)	94 (7.6)	79 (5.2)	149.4, 6, <.001
Never Married	1943 (23.2)	519 (42.2)	402 (33.0)	162 (13.3)	139 (11.4)	
Education						
0–11 Years	1371 (16.8)	527 (57.8)	269 (27.5)	89 (8.7)	65 (6.1)	
12 Years	2796 (32.5)	1092 (56.4)	560 (27.1)	190 (9.2)	150 (7.3)	12.0, 9, .210
13–15 Years	2726 (27.6)	1058 (53.0)	556 (29.1)	203 (10.1)	143 (7.8)	
16+ Years	2389 (23.1)	911 (54.9)	474 (26.5)	184 (11.2)	143 (7.4)	
Lived with Both Parents Until 18						
Yes	4563 (69.1)	2490 (55.4)	1266 (27.6)	463 (10.0)	333 (7.0)	1.421, 3, .701
No	2062 (30.9)	1095 (55.1)	591 (27.6)	202 (9.5)	168 (7.8)	
Lifetime Major Depressive Episode						
Yes	1829 (19.2)	977 (53.2)	500 (28.8)	163 (9.6)	156 (8.4)	4.3, 3, .235
No	7453 (80.8)	2611 (55.9)	1359 (27.3)	503 (9.8)	345 (7.0)	
Religious Affiliation						
Protestant	3515 (53.7)	2248 (65.2)	943 (26.0)	225 (5.9)	95 (2.9)	
Catholic	1589 (24.7)	807 (53.0)	552 (34.4)	161 (9.3)	67 (3.4)	1344.1, 9, <.001

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	Overall N (wt%)	High Religiosity N (wt%)	Moderate Religiosity N (wt%)	Low Religiosity N (wt%)	Very Low Religiosity N (wt%)	χ^2 or F, df, p-value
No Religious Preference	969 (14.1)	196 (18.1)	231 (23.9)	225 (25.8)	310 (32.2)	
Other	536 (7.5)	327 (63.1)	126 (22.8)	54 (9.6)	29 (4.5)	

Values are N (weighted percent) unless otherwise noted. P-value refers to chi-squared test for categorical variables and F-tests for continuous variables.

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Table 2

Association between religiosity in childhood and religiosity in adulthood and recent substance use and misuse

	Frequent alcohol use (>= 3/ week)	Current smoker	Used drugs in past 12 months	12 Mo. alcohol abuse/ dependence	12 Mo. nicotine dependence	12 Mo. drug abuse/ dependence
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Religiosity in adulthood						
High (reference)	1	1	1	1	1	1
Moderate	1.42 (1.07–1.87)	1.82 (1.38–2.41)	1.45 (0.93–2.26)	1.24 (0.80–1.91)	1.30 (0.91–1.87)	0.71 (0.40–1.25)
Low	1.59 (1.08–2.35)	1.54 (1.16–2.03)	2.43 (1.77–3.32)	2.14 (1.17–3.91)	1.62 (1.00–2.62)	1.79 (0.79–4.06)
Very low	1.77 (1.19–2.63)	1.77 (1.37–2.29)	1.87 (1.07–3.26)	1.59 (0.76–3.34)	1.93 (1.09–3.42)	1.04 (0.37–2.90)
Religiosity in childhood						
High (reference)	1	1	1	1	1	1
Moderate	0.85 (0.64–1.14)	0.85 (0.70–1.04)	0.99 (0.77–1.27)	0.84 (0.56–1.24)	0.82 (0.52–1.29)	0.63 (0.31–1.27)
Low	0.65 (0.50–0.85)	0.94 (0.74–1.18)	1.39 (1.04–1.87)	0.53 (0.28–0.97)	1.43 (0.88–2.33)	0.94 (0.37–2.39)
Very low	0.95 (0.68–1.34)	1.36 (0.93–1.97)	1.53 (1.09–2.14)	1.19 (0.66–2.17)	1.61 (0.88–2.96)	1.22 (0.52–2.90)

Values refer to odds ratio (95% Confidence intervals). All estimates are adjusted for age, sex, race/ancestry, marital status, education, living with both parents until age 18 and lifetime major depressive episode.

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Table 3

Association between religiosity in childhood and religiosity in adulthood and substance use and misuse

	Early alcohol use	Ever been a smoker	Ever used illicit drugs	Alcohol abuse/dependence	Nicotine dependence	Drug abuse/dependence
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Religiosity in adulthood						
High (reference)	1	1	1	1	1	1
Moderate	0.97 (0.82–1.14)	1.52 (1.27–1.83)	1.21 (0.98–1.50)	1.15 (0.91–1.46)	1.08 (0.80–1.46)	0.83 (0.64–1.08)
Low	1.14 (1.87–1.51)	1.32 (1.06–1.65)	1.45 (1.14–1.85)	1.41 (1.09–1.81)	1.56 (1.06–2.30)	1.38 (0.99–1.92)
Very low	1.55 (1.10–2.19)	2.20 (1.66–2.90)	1.54 (1.02–2.33)	1.48 (0.96–2.28)	1.87 (1.07–3.28)	1.53 (0.94–2.49)
Religiosity in childhood						
High (reference)	1	1	1	1	1	1
Moderate	1.14 (0.99–1.32)	1.09 (0.89–1.33)	1.19 (0.97–1.45)	1.13 (0.88–1.45)	0.95 (0.71–1.28)	1.17 (0.91–1.51)
Low	1.48 (1.21–1.83)	0.99 (0.79–1.24)	1.73 (1.35–2.22)	1.28 (0.99–1.66)	1.34 (0.99–1.82)	1.48 (1.08–2.02)
Very low	1.46 (1.03–2.07)	1.49 (0.95–2.34)	1.29 (0.91–1.82)	1.77 (1.25–2.51)	1.44 (0.79–2.61)	0.92 (0.60–1.41)

Values refer to odds ratio (95% Confidence intervals). All estimates are adjusted for age, sex, race/ancestry, marital status, education, living with both parents until age 18 and lifetime major depressive episode.

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Table 4

Association between change in religiosity from childhood to adulthood and recent substance use and abuse/dependence

	Frequent alcohol use (>= 3/week) OR (95% CI)	Current smoker OR (95% CI)	Used drugs in past 12 months OR (95% CI)	12 Mo. alcohol abuse/ dependence OR (95% CI)	12 Mo. nicotine dependence OR (95% CI)	12 Mo. drug abuse/ dependence OR (95% CI)
Increase from childhood to adulthood						
No change (reference)	1	1	1	1	1	1
N= 3,185 (51.3%)						
Slight change	1.00 (0.78–1.29)	0.87 (0.66–1.13)	1.29 (0.96–1.73)	0.97 (0.64–1.47)	1.22 (0.90–1.66)	1.10 (0.57–2.11)
N = 1,295(20.9%)	[159/943]	[324/1325]	[151/1295]	[36/1295]	[64/1295]	[17/1295]
Moderate change	0.67 (0.43–1.06)	1.06 (0.73–1.53)	1.85 (1.09–3.13)	1.47 (0.76–2.83)	1.41 (0.90–2.22)	1.98 (0.91–4.30)
N = 422 (6.8%)	[40/322]	[122/415]	[48/422]	[17/422]	[24/422]	[11/422]
Significant change	0.80 (0.37–1.73)	1.04 (0.51–2.13)	1.97 (1.02–3.82)	2.60 (1.17–5.78)	1.42 (0.55–3.69)	1.84 (0.48–7.03)
N = 114 (1.8%)	[15/85]	[33/112]	[21/114]	[8/114]	[7/114]	[3/114]
Decrease from childhood to adulthood						
No change (reference)	1	1	1	1	1	1
N= 3,185 (51.3%)						
Slight change	1.30 (0.96–1.74)	1.44 (1.14–1.81)	1.72 (1.24–2.30)	2.10 (1.30–3.41)	1.56 (1.02–2.39)	1.36 (0.67–2.77)
N = 929 (15.0%)	[171/725]	[307/930]	[141/929]	[44/929]	[52/929]	[18/929]
Moderate change	1.80 (1.06–3.05)	1.21 (0.76–1.94)	2.43 (1.39–4.25)	2.77 (1.28–5.98)	1.40 (0.62–3.14)	3.47 (1.00–12.01)
N = 186 (3.0%)	[37/152]	[56/199]	[32/186]	[10/186]	[10/186]	[5/186]
Significant	1.59 (0.79–3.22)	1.22 (0.62–2.40)	3.90 (1.40–10.86)	1.64 (0.37–7.26)	1.49 (0.48–4.61)	0.44 (0.05–4.36)
N = 72 (1.2%)	[17/53]	[24/68]	[19/72]	[4/72]	[5/72]	[1/72]

Values refer to odds ratio (95% Confidence intervals). All estimates are adjusted for age, sex, race/ancestry, marital status, education, living with both parents until age 18 and lifetime major depressive episode. Values in brackets represent the number of individuals who had recent substance use/total number of individuals in each religiosity category.

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Table 5

Association between change in religiosity from childhood to adulthood and lifetime substance use and abuse/dependence

	Early alcohol use OR (95% CI)	Ever been a smoker OR (95% CI)	Ever used illicit drugs OR (95% CI)	Alcohol abuse/dependence OR (95% CI)	Nicotine dependence OR (95% CI)	Drug abuse/dependence OR (95% CI)
Increase from childhood to adulthood						
No change (reference) N= 3,185 (51.3%)	1	1	1	1	1	1
Slight change N = 1,295(20.9%)	1.32 (1.13–1.53)	1.11 (0.90–1.38)	1.12 (0.87–1.44)	1.78 (1.44–2.21)	1.20 (0.98–1.46)	1.43 (1.12–1.81)
Moderate change N = 422 (6.8%)	1.53 (1.10–2.14)	1.26 (0.95–1.67)	2.29 (1.72–3.05)	2.22 (1.67–2.96)	1.52 (1.10–2.10)	2.03 (1.42–2.91)
Significant change N = 114 (1.8%)	0.93 (0.44–1.96)	1.31 (0.66–2.59)	0.96 (0.58–1.60)	1.61 (0.78–3.29)	1.06 (0.44–2.55)	1.20 (0.64–2.23)
Decrease from childhood to adulthood						
No change (reference) N= 3,185 (51.3%)	1	1	1	1	1	1
Slight change N = 929 (15.0%)	1.14 (0.89–1.46)	1.47 (1.22–1.78)	1.34 (1.05–1.72)	1.76 (1.34–2.30)	1.17 (0.85–1.61)	1.51 (1.12–2.05)
Moderate change N = 186 (3.0%)	1.34 (0.86–2.08)	2.05 (1.35–3.11)	1.81 (1.19–2.76)	2.49 (1.67–3.70)	2.47 (1.45–4.21)	2.61 (1.51–4.53)
Significant N = 72 (1.2%)	2.25 (1.00–5.08)	2.71 (1.28–5.70)	1.72 (0.60–4.91)	3.12 (1.38–7.05)	1.87 (0.71–4.93)	2.20 (0.83–5.82)

Values refer to odds ratio (95% Confidence intervals). All estimates are adjusted for age, sex, race/ancestry, marital status, education, living with both parents until age 18 and lifetime major depressive episode.

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Table 6

Associations between extreme child/adult religiosity combination groups and lifetime substance use and abuse/dependence.

	Early alcohol use	Ever been a smoker	Ever used illicit drugs	Alcohol abuse/dependence	Nicotine dependence	Drug abuse/dependence
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Childhood–Adult religiosity						
Low–Low	2.78 (1.73–4.47)	1.89 (1.06–3.36)	1.21 (0.66–2.21)	1.50 (0.90–2.52)	2.35(1.23–4.51)	0.97 (0.63–1.49)
N = 106 (1.7%)	[63/82]	[58/84]	[31/84]	[23/84]	[17/84]	[11/83]
High–High	0.79 (0.68–0.93)	0.68 (0.57–0.81)	0.60 (0.46–0.78)	0.54 (0.43–0.67)	0.81 (0.61–1.07)	0.66 (0.51–0.84)
N=2070 (33.4%)	[602/1562]	[803/1868]	[250/1869]	[131/1868]	[117/1868]	[81/1868]
High–Low	1.90 (0.86–4.17)	2.15 (0.98–4.71)	1.31 (0.48–3.58)	1.97 (0.88–4.42)	1.58 (0.62–4.03)	1.52 (0.59–3.93)
N = 72 (1.2%)	[34/51]	[37/52]	[18/52]	[16/52]	[7/51]	[8/51]
Low–High	0.78 (0.36–1.67)	1.05 (0.52–2.16)	0.69 (0.44–1.09)	0.97 (0.45–2.09)	0.92 (0.37–2.31)	0.84 (0.47–1.49)
N = 114 (1.8%)	[42/95]	[53/98]	[20/99]	[14/98]	[8/99]	[8/99]
All others (Reference)	1	1	1	1	1	1
N=3841 (61.9%)	[1515/3046]	[1689/3234]	[831/3233]	[484/3234]	[278/3234]	[290/3234]

Values refer to odds ratio (95% Confidence intervals). All estimates are adjusted for age, sex, race/ancestry, marital status, education, living with both parents until age 18 and lifetime major depressive episode. Values in brackets represent the number of individuals who had recent substance use/total number of individuals in each religiosity category.