Does Religion Offer Worldviews That Dissuade Adolescent Substance Use?

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Worldviews provide answers to questions such as who am I, why am I here, and how should I behave. We examined whether being religious corresponds with having a stronger worldview and whether the worldview accounts for the commonly observed relationship between religiousness and substance use. Adolescents (N = 1,253) completed measures of religiousness, worldview, and alcohol, marijuana, and cigarette use. Regarding the dichotomous distinction between using and not using a substance, a stronger worldview corresponded with not using substances and partially mediated the relationship between religiousness and substance use. Among users, however, one’s worldview did not mediate the amount of substance use. These findings suggest that the benefits of a worldview are limited to the decision to use substances, but once an adolescent becomes a user, a strong worldview no longer deters substance use.

Keywords: adolescent, religiousness, worldview, meaning, risk behavior, substance use

Religiousness is associated with a reduction in adolescents’ use of alcohol (Amey, Albrecht, & Miller, 1996; Cochran & Akers, 1989; Miller, Davies, & Greenwald, 2000; Wallace Jr & Forman, 1998), cigarettes (Amey et al., 1996; Wallace Jr & Forman, 1998), and marijuana (Amey et al., 1996; Cochran & Akers, 1989; Miller et al., 2000; Wallace Jr & Forman, 1998). Less clear is why religiousness has this protective effect. Some theorists have proffered explanations accentuating the importance of parents’ level of religiousness (Burkett, 1977) and the existence of positive peers (Burkett & Warren, 1987), whereas other theorists have offered broader models and argued that religion exerts its positive influence on adolescents through a set of mutually reinforcing factors that can be organized under the umbrellas of moral order, learned competencies, and social and organizational ties (Smith, 2003).

Although we recognize the explanatory importance of parents, peers, and other social ties with regard to adolescents’ substance use, in the current work we examine a particular element of religious beliefs that may discourage negative behaviors. Specifically, we explore whether the benefits of religion come from providing believers with a worldview.

Proposed Protective Mechanisms of Religiousness

One central contribution of organized religions is the conveyance of a worldview to individual followers. Worldview simply means an explanatory way of seeing the world. Although each religion imparts a different worldview, we are not concerned with the content of the participants’ worldview. Rather, we are interested in the relative strength of the worldview, whether increased religiousness is associated with a stronger worldview, and whether having such an explanatory lens corresponds with lower substance use for adolescents. To gain traction on the concept of a worldview, we deconstruct it into the constituent parts of having personal integrity, a sense of meaning, and a moral compass. These three components of a worldview give people high in religiousness a way to address the interrelated questions of “Who am I?”, “Why am I here?”, and “How should I behave?” We propose that
Religiousness may protect adolescents against substance use through fostering personal integrity. Personal integrity refers to having steadfast commitment to ethical principles (Schlenker, 2008), which means being relatively uncompromising and unyielding in adherence to the ethical principles. Many factors may influence the development and nature of a person’s ethical principles, but a primary influence is often the person’s religion. Because many religious organizations explicitly or implicitly condemn the use of controlled substances, the greater personal integrity that accompanies religious belief systems should result in lower use of these substances. Thus, we predict that higher religiousness will correspond with greater personal integrity, which in turn will correspond with less substance use.

**Moral Compass**

Religiousness may also protect adolescents against substance use by providing them with a coherent moral compass—a clear sense of what is right and what is wrong. A central aspect of organized religions is providing followers with rules governing behavior, that is, what behaviors are allowed and disallowed. As noted in a recent review, “Religion has its effects, at least in part, through the substantive claims it makes about what is right and what is wrong” (Bloom, 2012, p. 195). For instance, some religions have explicit rules precluding the use of substances such as alcohol (e.g., as for Mormons, Muslims, and Southern Baptists) perhaps in part because they view the body as a temple that should not be abused by ingesting potentially harmfully substances. Use of controlled substances may also violate indirectly religious teachings (e.g., the Christian commandment to “Honor thy father and thy mother”) through disobedience to important authority figures, or because it can be a pathway to temptation and sinful behavior. More importantly, highly religious adolescents may have a better sense of the specifics of those rules (and the consequences for disobeying them) because those rules are consistently communicated in religious teachings and by members of religious communities. In summary, the moral compass provided by religious belief systems should lead to less willingness to use controlled substances. Thus, we predict that high religiousness will correspond with a stronger moral compass, which in turn will correspond with less substance use.

**Overview**

We examined whether the three components of a worldview can account for the relationship between religiousness and substance use in a large sample of adolescents. We operationalized religiousness in two ways. First we measured individual differences in religiousness using a measure specifically designed for adolescents (Miller, Shepperd, & McCullough, 2013). Second, we distinguished religious adolescents (adolescents reporting belonging to a religious group) from nonreligious adolescents (adolescents reporting that they were agnostic or atheist) in recognition that nonreligious adolescents may have difficulty responding to a measure of religiousness. In line with prior research, we predicted that greater religiousness would correspond with lower substance use. If a primary benefit of religion is that it offers believers a coherent worldview, then greater religiousness should also correspond to a stronger worldview. Thus, we hypothesized that higher scores on our worldview measures (integrity, a moral compass, and sense of meaning) would correspond with greater religiousness and that religious adolescents would score higher than nonreligious adolescents on the worldview measures.

We also hypothesized that higher scores on measures of integrity, a moral compass, and sense of meaning would correspond with lower cigarette, alcohol, and marijuana use and would ac-
count, at least in part, for the relationship between religiousness and these behaviors. Finally, we conducted exploratory analyses using moderated mediation to examine whether our effects differ by sex, race or as a function of being religious or not. Our particular interest was in examining whether worldview mediates the relationship between religiousness and substance use among religious adolescents but not among nonreligious adolescents. We reasoned that the worldview offered by religions may be particularly discouraging of substance use.

Method

Participants
We describe data from the second wave of data collection from a large, longitudinal study of religion and adolescent substance use currently in its third year of operation. We initially sent ~12,000 letters to parents of 9th-graders in school districts in central and north central Florida inviting their child to participate in an online study examining religiousness and substance use. We then sent an email with a personal password and link to 2,128 adolescents whose parents returned signed consent forms. Of the 1,428 people that logged into the Web page, six were ineligible based on their grade and three withdrew without completing the Time 1 survey, giving us an initial sample of 1,419 students (677 male, 735 female, and 7 not reported) that we contacted to complete the Time 2 follow-up survey 6 months later (i.e., during the spring of 9th grade). Of these students, 1,253 (598 male, 649 female, and 6 not reported) completed the Time 2 survey for an 88% return rate. Participants were predominantly White/Non-Hispanic (White/Non-Hispanic = 871, White/Hispanic = 70, Black = 109, Asian American/Pacific Islander = 32, Other = 117, not reported = 54), 15 years old (14 = 201, 15 = 888, 16 = 142, 17 = 19, 18 = 2, 19 = 1), and Christian/Protestant (Christian/Protestant = 725, Catholic = 160, Agnostic = 120, Atheist = 57, Hindu = 8, Muslim = 6, Jewish = 19, Buddhist = 8, Mormon = 8, Other = 65, not reported = 77). Participants received $35 for completing the Time 1 survey and $15 for completing the shorter, Time 2 survey. This report is limited to responses to the Time 2 survey.

Procedure
Participants logged in to the survey Web page and read a brief statement that restated the purpose and duration of the study, reassured participants that their responses were confidential, and again described the compensation participants would receive for completing the surveys. Next, participants completed the survey questionnaires presented in random order.

Materials

Demographic items. Demographic items assessed participants’ sex, age, ethnic background, and religion.

Religious Commitment Inventory for Adolescents (RCI-A). We measured religiousness using the RCI-A, an 11 item measure based on the Religious Commitment Inventory (RCI-10) that assesses the extent to which people follow their religious values, beliefs, and practices (Miller et al., 2013). The RCI-A splits a doubled barreled item and uses simpler language so that it is appropriate for adolescents. In our sample, the RCI-A was highly reliable (Cronbach’s α = .96). Example items include, I enjoy participating in religious activities, and I am involved in my religious group. Participants responded to each item on a 5-step scale (1 = not at all true of me; 5 = totally true of me). We recognize that adolescents who classify themselves as agnostic or atheist could be confused by the items on the RCI-A. However, the responses of these participants were clearly not random. Although we observed some variability in their responses, our agnostic and atheist participants responded at the low end of the scale. More importantly, Cronbach’s α on the RCI-A was high for both the agnostic (α = .84) and atheist (α = .94) adolescents, suggesting that these participants were responding consistently to the RCI-A.

Integrity Scale. We adapted items from the Integrity Scale (Schlenker, 2008) to assess the extent to which adolescents report adherence to a set of principles and an unwillingness to rationalize unprincipled behavior despite temptations or costs. Because the original scale was developed for college students, many of the items were inappropriate or too complex for young adolescents. We adapted 10 items from the original 18 item scale for our purposes. All of our changes to items involved simplifying the language. For example, an item on the original scale that read, “Some actions are wrong no matter what the consequences or justification," was reworded to read, “Some acts are wrong no matter what reason is given.” Participants responded to each item on a 5-step scale (1 = strongly agree; 5 = strongly agree). Prior research suggests that the scale has adequate psychometric qualities (Johnson & Schlenker, 2011). Cronbach’s α for our sample was .67.

Meaning in Life Scale. We used four items from the Meaning in Life Scale to assess the extent to which participants have made sense of and feel a sense of significance regarding their own existence (Steger, Frazier, Oishi, & Kaler, 2006). The items were (a) I know my life’s meaning, (b) My life has a clear sense of purpose, (c) I have a good sense of what makes my life important, and (d) I have found a satisfying life purpose. Participants responded to each item on a 5-step scale (1 = strongly agree; 5 = strongly agree). Prior research suggests that the scale is both valid and reliable (Steger et al., 2006). Similarly, the Meaning in Life Scale was reliable in our sample (α = .91).

Moral Compass Scale. We measured the extent to which participants possess a clear sense of what is right and wrong using four items that we developed. The items were, (a) I have a strong sense of what is right and wrong, (b) In all situations the right thing to do is obvious to me, (c) It is easy for me to tell the difference between what is right and wrong, and (d) I have a clear sense of what is right or wrong. Participants responded to each item on a 5-step scale (1 = strongly agree; 5 = strongly agree). A principal-axis factor analysis revealed a single factor with loadings ranging from .75 to .90. The scale accounted for 56% to 81% of the variance in the items. Cronbach’s α for the scale was .86.

Substance use. Participants reported for the prior 6 months the total number of cigarettes they smoked and how often they drank alcohol, and used marijuana. For example, to assess extent of smoking cigarettes, we asked participants, In the past 6 months, have you smoked cigarettes? (Yes, No, or Choose Not to Answer). We provided participants who responded Yes with calendars and asked them, During the past 6 months, how many cigarettes did you smoke?
Results
The sample sizes vary across analyses because of missing data for some participants for some survey items. Preliminary analyses revealed that in the past 6 months, 7.5% (i.e., 94 of 1248) of participants reported smoking cigarettes, 21.3% (263 of 1237) of participants reported consuming alcohol, and 8.8% (109 of 1238) of participants reported using marijuana. Participants who reported smoking cigarettes indicated that they smoked an average of 161.7 cigarettes ($SD = 593.2$). Participants who reported consuming alcohol indicated that they drank an average of 5.5 times ($SD = 9.1$). Participants who reported using marijuana indicated that they smoked marijuana an average of 25.4 times ($SD = 68.2$). The proportion of adolescents reporting using substances is lower in our sample than in a sample of Florida 9th-graders surveyed by the Centers for Disease Control and Prevention (CDC). In the CDCs sample, 10.7% reported using cigarettes, 28.7% reported using alcohol, and 16.9% reported using marijuana (Centers for Disease Control and Prevention, 2013). The difference likely reflects the fact that most of the major metropolitan areas of Florida (Tampa, Orlando, Jacksonville, and Miami) were not represented in our sample.

Factor Analysis
We used factor analyses to test whether our measures of Meaning, Integrity, and Moral Compass held together as a larger factor we call Worldview. Exploratory factor analyses revealed that the Integrity scale items comprised two factors rather than one. We refer to the second factor as “Lying is Unacceptable” because the three items that constitute the factor all deal with the acceptability of lying. In addition, we dropped one item from the Integrity Scale because it did not significantly load on either factor. Confirmatory factor analyses of the RCI-A, Meaning in Life Scale, and Moral Compass and Integrity (Integrity and Lying is Unacceptable) Scales revealed that all achieved adequate model fit. Finally, to create a more parsimonious model, we treated our measures of meaning, moral compass, integrity, and the unacceptability of lying as indicators of a second-order factor. The results of a $\chi^2$ difference test supported the acceptance of the second-order model. Additional information about the confirmatory factor analysis is available from the authors.

Group Differences in Worldviews
If one of the benefits of religion is that it provides people with a worldview, then adolescents who are religious should report stronger worldviews (i.e., score higher on our various worldview measures) than should adolescents who are not religious. Table 1 presents the mean summary responses to our worldview measures by religious orientation, gender, and race. For our analyses, we treated our worldview indicators as measured variables rather than as latent variables in a path model. We analyzed the effect of religious orientation in two ways. First, we combined adolescents who classified themselves as agnostic or atheist into one group (nonreligious adolescents) and all other adolescents into a second group (religious adolescents). Because we had a priori, directional hypotheses regarding these group differences, we set $\alpha = .05$. As predicted, across all four measures religious adolescents reported a stronger worldview than did nonreligious adolescents. Specifi-

Table 1
Mean Responses on the Worldview Measures

<table>
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<tr>
<th>Demographic</th>
<th>$n$</th>
<th>$M$</th>
<th>$SD$</th>
<th>$M$</th>
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<td>176</td>
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<td>4.5</td>
<td>16.3</td>
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<td>23.1</td>
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<td>11.3</td>
<td>3.3</td>
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<td>16.3</td>
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<td>9.8</td>
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<td>2.4</td>
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<td>11.0</td>
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<td>11.4</td>
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<td>Hindu</td>
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<td>16.8</td>
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<td>24.8</td>
<td>3.4</td>
<td>10.5</td>
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<td>25.5</td>
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<td>9.8</td>
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<td>25.1</td>
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<tr>
<td>Boys</td>
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<td>4.0</td>
<td>16.8</td>
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<td>Girls</td>
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<td>4.1</td>
<td>16.9</td>
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<td>4.2</td>
<td>11.4</td>
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<td>Asian American</td>
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<td>14.5</td>
<td>3.2</td>
<td>15.7</td>
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<td>3.5</td>
<td>10.0</td>
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<tr>
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<td>16.4</td>
<td>4.0</td>
<td>17.4</td>
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<td>24.4</td>
<td>4.3</td>
<td>10.9</td>
<td>3.3</td>
</tr>
</tbody>
</table>

Note. All subscripts refer to comparisons within categories within a single column. For religious affiliation, where we had a priori hypotheses, means with different subscripts differ at $p < .05$. For religious orientation, gender, and race means with differing subscripts different using the Tukey HSD test. Means based on small samples should be interpreted cautiously.
cally, religious adolescents reported greater meaning \((F(1, 1168) = 48.02, p < .001, \eta^2 = .04)\), a stronger moral compass \((F(1, 1169) = 6.67, p = .01, \eta^2 = .01)\), higher integrity \((F(1, 1168) = 24.30, p < .001, \eta^2 = .02)\), and were more likely to rate lying as unacceptable \((F(1, 1169) = 43.20, p < .001, \eta^2 = .04)\). These findings are consistent with the notion that religion provides adolescents with a stronger worldview.

Second, we examined the various religious categories separately. To protect against family wise error, we set \(\alpha = .01\). In cases where an omnibus analysis of variance (ANOVA) revealed a significant effect, we probed for differences between means using the Tukey’s honest significant difference (HSD) test. Religious orientation significantly predicted meaning in life \((F(9, 1160) = 6.63, p < .001, \eta^2 = .05)\), integrity \((F(9, 1160) = 3.13, p < .01, \eta^2 = .02)\), and lying is unacceptable \((F(9, 1161) = 5.79, p < .001, \eta^2 = .04)\). Religious orientation did not significantly predict moral compass \((F(9, 1161) = 1.59, p = .11, \eta^2 = .01)\). Because of small sample sizes, the means of participants by specific religious orientations should be viewed cautiously. Nevertheless, it is noteworthy that post hoc Tukey’s HSD tests revealed that adolescents who described themselves as agnostic or atheist generally reported the lowest mean responses to the various worldview measures. In contrast, adolescents who reported that they were Mormon consistently reported the highest mean responses to the various worldview measures.

Exploratory analyses, again setting \(\alpha = .01\) for the omnibus ANOVAs to protect against family wise error, revealed several other interesting findings. First, girls were more likely than boys to rate lying as unacceptable \((F(1, 1238) = 15.08, p < .001, \eta^2 = .01)\). Second, responses to the meaning scale varied by race \((F(3, 1199) = 4.96, p < .01, \eta^2 = .01)\). Post hoc analyses using Tukey’s HSD test revealed that Black participants scored higher on meaning than did White “other” participants. We observed no other gender or race differences.

**Group Differences in Substance Use**

Finally, we examined whether religious and nonreligious adolescents differed in their substance use. Because the extent of substance use was highly skewed, we used the dichotomous substance use items as our outcome measures. Analysis revealed that nonreligious adolescents, compared with religious adolescents, were more likely in the prior 6 months, to smoke cigarettes (14% vs. 6%), \(\chi^2(1, N = 1172) = 14.64, p < .001, \Phi = -.11, p < .001\); drink alcohol (34% vs. 19%), \(\chi^2(1, N = 1161) = 20.16, p < .001, \Phi = -.13\); and use marijuana (17% vs. 7%), \(\chi^2(1, N = 1164) = 19.49, p < .001, \Phi = -.13\).

**Mediation Models**

Does strength of worldview account for the effect of religiousness on substance use? To address this question we first computed the correlations between our measures. As evident in Table 2, all four worldview measures correlated with each other (correlations ranged from .16 to .47) and with religiousness (correlations ranged from .26 to .38). In addition, religiousness correlated with our three measures of substance use and our three measures of substance use correlated with each other. Finally, all four indicators of worldview correlated with all three dichotomous measures of substance use.

We next tested mediation for each substance using MPlus6. Because these mediation analyses involved a priori hypotheses, we set \(\alpha = .05\). The mediation analyses involved negative binomial hurdle models (McDowell, 2003), which are appropriate for count data and provide models for two processes. The first step examines the dichotomous response of whether a participant did or did not use a substance. The first step specifically predicts zeroes on the outcome measure (i.e., lack of substance use). The second step is limited to participants who used a substance and examines how much of the substance a participant used. The second step specifically predicts responses greater than zero. We chose the negative binomial distribution because it is appropriate for positively skewed data in which the variance exceeds the corresponding mean. With each model we treated worldview as a mediator of the relationship between religiousness and substance use (cigarette smoking, alcohol use, and marijuana use) and computed Monte Carlo confidence intervals for indirect effects (Preacher & Selig, 2012). We predicted that worldview (as reflected in integrity, lying unacceptability, moral compass, and sense of meaning) would account for the relationship between religiousness and substance use. More importantly, because the second model is confined to participants who used a substance, the statistical power may be weaker.

Figure 1 presents the meditational models for each substance. For the paths predicting substance use, we present several unstandardized path coefficients. The coefficients to the left of a slash

<table>
<thead>
<tr>
<th>Table 2</th>
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<td>Correlations Among Predictor and Outcome Measures</td>
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<th>Variable</th>
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<th>Use cigarettes</th>
<th>Use alcohol</th>
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<td>Use alcohol</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.12**</td>
</tr>
<tr>
<td>Use marijuana</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.13**</td>
</tr>
</tbody>
</table>

Note. Substance use measures are dichotomous (0 = no; 1 = yes), *p < .01. **p < .001.
refer to the first step in the hurdle model (predicting whether participants did not use the substance). The coefficients to the right of a slash refer to the second step in the model (predicting the extent of substance use among users). Regarding the link from religiousness to substance use, the top set of coefficients represents the relationship between religious and use of the substance before entering worldview in the model. The second set of coefficients (with brackets) represents the relationship after controlling for worldview. Path coefficients for the process predicting use or no use appear first, followed by the process predicting extent of use among users. * p < .05, ** p < .01, *** p < .001.

Figure 1. Mediation Models with unstandardized path coefficients and SE (in parentheses). For the path from religiousness to substance use, the first set of coefficients represents the relationship between religiousness and substance without worldview in the model. The second set of coefficients (with brackets) represents the relationship after controlling for worldview. Path coefficients for the process predicting use or no use appear first, followed by the process predicting extent of use among users. * p < .05, ** p < .01, *** p < .001.
participants who reported smoking levels that were five or more times greater than the levels for other smokers. Because they were such extreme outliers, we trimmed these three participants from our analyses of cigarette use.

We first examined the path from religiousness to substance use. As indicated by the coefficients left of the slash, we observed a direct effect of religiousness on substance use for all three substances such that greater religiousness predicted not using the substances. As indicated by the coefficients right of the slash, when we controlled for worldview, greater religiousness continued to predict less cigarette and marijuana use (but not less frequent alcohol use) among users. Of interest to the authors, the size of coefficient is larger for cigarette use after worldview entered the model \( B = -1.74 \) compared with before worldview entered the model \( B = -1.54 \), suggesting that worldview possibly has a suppressor effect on religiousness.

Next we examined the path from religiousness to worldview. In all three models, greater religiousness corresponded with a stronger worldview (i.e., a stronger sense of meaning, moral compass, commitment to principles, and belief that lying is unacceptable). Third, we examined the path from worldview to substance use. Regarding the coefficients left of the slash, a stronger worldview predicted the dichotomous choice of not using all three substances. Regarding the coefficients right of the slash, worldview did not predict frequency of use of any substance among users.

We present the results of the indirect effects tests in Table 3. For each substance use outcome we tested whether a stronger worldview mediated the relationship between religiousness and lack of substance use (see Step 1) and the amount or frequency of use among users (see Step 2). As seen in Table 3, our results suggest that a stronger worldview partially mediates the relationship between religiousness and lack of use for all three substances. However, worldview did not mediate the relationship between religiousness and the extent of cigarette, alcohol, and marijuana use.

Moderated Mediation

To be thorough in our analyses, we conducted exploratory moderated mediation analyses to test whether the direct and indirect effects of religiousness on substance use was consistent across gender, race, and religious affiliation. Of particular interest was whether the effects vary by religious affiliation (being religious vs. nonreligious), which would tell us whether having a worldview is beneficial to religious and nonreligious adolescents alike. To examine possible group differences, we ran a series of models that included interaction terms representing the interaction between group membership (e.g., gender) and each model path (e.g., religiousness to cigarette use). Significant interactions between group membership and the paths from religiousness to substance use indicate that the direct effects are moderated by group membership. Significant interactions between group membership and either the path from religiousness to worldview or worldview to substance use indicate that the mediation is moderated by group membership. For race, we only compared participants who were White/Non-Hispanic with participants who were Non-White. For religion, we compared participants who reported belonging to a religious group (including other) with participants who did not (agnostic and atheist). Because these analyses were exploratory, we set \( \alpha \) at .01 to protect against family wise error.

Tests of the direct and indirect effects revealed significant interactions of religiousness on frequency of marijuana use. Specifically, the direct effect of religiousness on the frequency of marijuana use varied as a function of religious affiliation, \( z = 3.45, p < .01 \). Among nonreligious participants, lower religiousness corresponded with greater marijuana use, \( b = -4.26, p < .001 \). Among religious participants, level of religiousness and marijuana use were unrelated, \( b = .47, ns \). In addition, test of the indirect effects revealed that religious affiliation moderated the indirect effect of religiousness on frequency of marijuana use, \( z = -2.84, p < .01 \). The indirect effect was significant for religious participants, \( b = -6.5, p < .01 \), but not for nonreligious participants, \( b = .36, ns \). When viewed together these findings suggest that level of religiousness has a direct effect on marijuana use only among nonreligious adolescents. Among religious adolescents, the effect of religiousness on marijuana use is explained entirely by level of worldview.

**Discussion**

Our study reveals several important findings. First, consistent with other research, religion may serve as a prophylactic to substance use among adolescents. We came to this conclusion based on two findings. We found that greater religiousness as measured by the RCI-A corresponded with lower use of cigarettes, alcohol, and marijuana. We also found that nonreligious adolescents were more likely than religious adolescents to use these substances. Second, religion appears to be an important source of a worldview. Stated otherwise, greater religiousness corresponded with a stronger worldview, and religious adolescents scored higher than did nonreligious adolescents (i.e., atheists and agnostics) on our worldview measures. We observed this finding regardless of whether we focused on the question of who am I (personal integrity, unacceptability of lying), why am I here (personal meaning), or how should I behave (moral compass).

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Indirect Effects With Monte Carlo Confidence Intervals for the Hypothesized Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cigarette use</td>
</tr>
<tr>
<td></td>
<td>Step 1</td>
</tr>
<tr>
<td>Unstandardized coefficients</td>
<td>.26**</td>
</tr>
<tr>
<td>SE</td>
<td>.10</td>
</tr>
<tr>
<td>95% CI</td>
<td>[.07, .46]</td>
</tr>
</tbody>
</table>

*Note. Step 1 = Predicting zero (not using the substance) in last 6 months. Step 2 = Predicting extent of substance use in last 6 months among users. 
** \( p < .05 \). * \( p < .01 \).
Third, a strong worldview appears to matter, at least for the decision to use or not use a substance. We observed that a stronger worldview corresponded with the lack of substance use in the previous 6 months. Moreover, a strong worldview explained part of the effect of religiousness on lack of substance use. When we entered religiousness and worldview into a structural equation model predicting lack of use of each substance, we found a reliable indirect effect through worldview for the dichotomous decision of substance use in the previous 6 months. More importantly, a stronger worldview did not correspond with the amount of substance used by users. Viewed together, these two sets of findings suggest that the benefits of a worldview are limited to the decision to use substances. However, once an adolescent becomes a user, a strong worldview no longer deters substance use. Obviously, this finding has important implications. Researchers may treat the decisions of “yes/no” and “how much” as synonymous or at least as highly related, when they may be quite distinct. Put another way, worldview appears important in predicting whether a person crosses the line (or to use a religious analogy, whether a person “sins”), but does not predict how far the person crosses the line.

Fourth, a strong worldview appears to influence absence of substance use regardless of its source. Our test of moderated mediation revealed the same pattern of results for religious and nonreligious adolescents in all three models predicting the dichotomous decision to use the substances, suggesting that a strong worldview is more important than the source of that worldview. This finding is consistent with recent theorizing that certain societal features available to all humans (e.g., a sense of belonging to a community) account for the positive moral effects often attributed to religion (Bloom, 2012).

Limitations and Future Directions

Limitations in our sample and methods constrain the conclusions we can draw but also suggest directions for future research. For example, we sent ~12,000 invitations to arrive at our sample of 1,428 participants. We learned at the outset from high school administrators that roughly 20% of the addresses we received were inaccurate. Indeed, we received boxes of invitations returned because of incorrect addresses. We also suspect that a large percentage of our invitations sent to correct addresses were perceived as junk mail and never opened. Regardless of why so few of the adolescents targeted to participate did not participate, the low uptake raises questions about the generality of our findings. More importantly, we do not pretend that our findings generalize much beyond our sample. Moreover, our primary concern in this stage of our research was testing theoretical relationships, not with generalization. We hope in the future to replicate our findings on a more representative sample.

In addition, although the inclusion of a large number of different religious groups contributes to our ability to generalize these findings to the broader construct of “religiousness,” the representation from some religious groups in our sample was small. For instance, the Mormons in our sample displayed the highest scores on all our worldview measures, yet their numbers were so few that we must view this finding cautiously. Likewise, our participants were adolescents from Florida, which is a southern state where religion and religious service attendance play a central role (Newport, 2012). More importantly, Floridians appear close to the national average on measures of religious sentiments (Pew Forum on Religion & Public Life, 2009). Thus, we expect our findings for religiousness to generalize to other parts of the country. However, we know of no study examining worldviews across regions, ages, and religions. Thus, it remains unknown whether our worldview findings would replicate elsewhere and for other samples.

Additionally, although our sample was modestly heterogeneous within Christianity, it included only very small numbers participants reporting being religious, but not being Christian. It remains to be seen whether our worldview findings will generalize to cultures that are predominantly Muslim or Buddhist, or to countries where religion is far less dominant. Further, it is possible that the importance of religion as a source of worldview is particularly high among young adolescents. As adolescents grow into adulthood, they may find alternative sources of worldviews. Alternatively, worldviews may evolve with age such that the link between religion and worldview and between worldview and substance weakens (or strengthens). These possibilities are intriguing and represent exciting directions for future research.

Of course, our findings rely on participants’ self-reports of substance use and it is possible that our participants are not accurately reporting their substance use or, for that matter, their religiousness. Although researchers have given little attention to the relationship between adolescent self-reports and behavior (Brener, Billy, & Grady, 2003), some evidence suggests that computer-based testing (as in the current study) leads to higher adolescent reports of substance use (Barttingham, Tourangeau, & Kay, 1998; Turner, Ku, Rogers, Lindberg, & Pleck, 1998; Wright, Aquilino, & Supple, 1998) and, according to some (Brener et al., 2003), greater accuracy. Finally, Brener et al. point out that test–retest reliability for self-reports of alcohol use and tobacco use is quite high. Moreover, studies that use a bogus pipeline approach (wherein researchers inform participants that they can tell whether or not responses are truthful) do not lead to increases in reports of substances use. These observations suggest that adolescent substance use self-reports are reliable and that the reservations that surround self-reports may be minimal in the current work.

A related concern, however, is that willingness to report substance use may correlate negatively with religiousness. In a scale development article drawing from this same sample, we found that the relationship between religiousness and substance use remained unchanged after controlling for social desirability (Miller et al., 2013). The absence of a social desirability effect suggests that the safeguards we included to protect identity minimized social desirability responding.

In developing and adapting measures of worldview for our purposes, we naturally selected and combined items in ways that maximized the psychometric properties of our measures. A possible consequence is that the psychometric characteristics (e.g., reliability) of our worldview measures are stronger in our sample than they would be in a second, independent sample, which would enhance our ability to find effects in our sample compared with a different sample. This possibility speaks to the need to replicate our findings in future research.

Finally, we note that although the data were part of a longitudinal study, we reported data from only one point in time—spring of 9th grade. We examined only data from one time point because we were not interested in change in religiousness and substance use over time. Rather, we were interested in whether worldview
can explain the relationship between religiousness and substance use within a specific time period. Unavoidably, our findings are correlational and we cannot be certain that variations in religiousness are responsible for the variations we observed in worldview strength. It is possible, for example, that the causal direction is reversed and that variations in worldview strength explain variations in religiousness. Indeed it makes intuitive sense that someone who values having a strong worldview is drawn to cultural bases of worldviews such as religion. Although this possibility is worth pursuing in future research, this alternative causal direction seems more likely among adults than among adolescents whose religious behavior is likely largely influenced by parents.

Closing Comments

Our findings suggest that religion is an important source of worldviews for adolescents, and that worldviews in turn are linked to substance use. These findings are striking and raise a new and fascinating array of questions. For example, what are the long-term implications for nonreligious adolescents as they grow into adulthood? Do they find alternative sources of worldviews or do their relatively weaker worldviews persist? Moreover, does the link between worldview and substance use persist into adulthood? Relatedly, given the link we found between worldview and alcohol and marijuana use, will the parts of the United States that are become less religious show increases in substance use among adolescents? More broadly, we cannot help but wonder about the implications for societies in Western Europe where the importance of religion appears to be waning. Are they finding alternative, comparable sources of worldviews and how do their worldviews correspond with substance use? Clearly, our findings merely scratch the surface and reveal many possible avenues for future research.

References


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