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Thrill Seeking and Religiosity in Relation to Adolescent Substance Use: Tests of Joint, Interactive, and Indirect Influences

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Abstract

Thrill seeking is a robust positive predictor of adolescent substance use. Religiosity is negatively associated with substance use among teens, although findings are mixed. Few studies have examined the interplay between these two prominent risk and protective factors. The current study addresses this gap by examining the joint, interactive, and indirect influences of thrill seeking and each of two dimensions of religiosity, religious salience and religious attendance, in relation to adolescent substance use. Participants were 667 rural youths (345 girls and 322 boys) and their families participating in a longitudinal family-focused prevention trial. Data were collected via self-report surveys at six time points across seven years, spanning ages 11 through 18. Results from latent growth curve analyses showed that both religious salience and religious attendance growth factors were associated negatively with late adolescent substance use, while adjusting for thrill seeking and selected covariates. Although the link between thrill seeking and substance use was not moderated by religiosity, there was a statistically significant indirect effect of thrill seeking on the outcome through a faster rate of downturn in religious attendance. Family intervention also predicted a slower rate of downturn in religious attendance and was associated negatively with substance use in late adolescence. Early adolescent substance use predicted a faster rate of decrease in religious salience throughout the teen years. The pattern of associations was similar for boys and girls. Findings suggest that teens who are elevated on thrill seeking could be targeted for specially-designed substance use prevention programs and provide additional evidence for the efficacy of family interventions.

Keywords

religiosity; thrill seeking; adolescence; substance use; longitudinal

Rates of adolescent substance use have declined in recent years, but remain high. Among 12th grade students in 2009, 72.3% reported having ever used alcohol, 43.6% reported having ever used cigarettes, and 42.0% reported having ever used marijuana (Johnston,

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O'Malley, Bachman, & Schulenberg, 2010). Adolescent substance use represents a serious public health concern. Substance use during the teen years can disrupt adolescent brain maturation (Medina, Schweinsburg, Cohen-Zion, Nagel, & Tapert, 2007; White & Swartzwelder, 2004) and is associated with a range of adverse short-term (e.g., physical fighting; drinking driving) and long-term (e.g., school problems, drug dependence) outcomes (Chen, Storr, & Anthony, 2001; Grant, Stinson, & Harford, 2001; Mathers, Toumbourou, Catalano, Williams, & Patton, 2006; Newcomb & Bentler, 1989; Windle & Windle, 2005).

Studies consistently indicate that characteristics of individuals, such as personality traits and personal beliefs, play a prominent role in the development of substance use among teens (for reviews, see Brown et al., 2008; Cicchetti & Rogosch, 1999; Hawkins, Catalano, & Miller, 1992). However, despite the identification of significant developmental predictors in the individual domain, there remains a need to better understand the interplay between specific risk and protective factors as they work together to either increase or decrease risk for substance use. The current analyses address this gap by examining the joint, interactive, and indirect influences of thrill seeking and each of two dimensions of religiosity, religious salience and religious attendance, in relation to adolescent substance use.

Among risk factors in the individual domain, sensation seeking consistently has been identified as a positive predictor of health-risk behaviors (Zuckerman, 2006), including substance use (Martin et al., 2004; Newcomb & McGee, 1991; Stacy, Newcomb, & Bentler, 1993). Sensation seeking typically is viewed as a biologically-based personality trait (Zuckerman, 1994; Zuckerman & Kuhlman, 2000). A key dimension of this trait involves the pursuit of stimulating and/or thrilling sensations and experiences (Zuckerman, 1979). Although such sensations and experiences can be prosocial (e.g., skate boarding, rock climbing), a thrill seeking orientation may represent a marker of increased risk for involvement in antisocial and health-compromising behaviors. Indeed, this component of sensation seeking, which correlates highly with the general construct (Rolison & Scherman, 2002; Zuckerman, 1971), is associated positively with substance use among teens (Cochran, Wood, & Arneklev, 1994; Pedersen, 1991). Thrill seeking teens may be drawn to substance use, in part, because it is a proscribed activity. Of note, brief measures of thrill seeking have been shown to have comparable convergent and predictive validity in relation to substance use risk factors and outcomes as broader measures of sensation seeking (Stephenson, Hoyle, Palmgreen, & Slater, 2003).

An important adolescent protective factor in the individual domain is religiosity (Jessor & Jessor, 1977; Sinha, Cnaan, & Gelles, 2007; Wallace & Forman, 1998). Religiosity is a multidimensional construct characterized by beliefs (e.g., belief in god) and activities (e.g., church attendance, prayer) that reflect an individual's valuing of and identification with religion (Kendler et al., 2003). Among the multiple dimensions of religiosity, religious salience, or the perceived importance ascribed by individuals to their religious values and experiences, and religious (e.g., church) attendance have been studied most frequently with regard to offering protection against adolescent substance use (Bahr, Maughan, Marcos, & Li, 1998; Barnes, Farrell, & Banerjee, 1994; Lorch & Hughes, 1985; Mason & Windle, 2002; Milot & Ludden, 2009; Sinha et al., 2007; Wallace, Brown, Bachman, & Laveist, 2003).

Research examining the positive link between thrill seeking and substance use has provided relatively robust findings (Zuckerman, 2006), whereas research examining the negative link between religiosity and substance use has been mixed. Several studies have reported statistically significant negative predictive associations of both religious salience and religious attendance with adolescent substance use, as noted above and reviewed by

Chitwood, Weiss, and Leukefeld (2008) and Geppert, Bogenschutz, & Miller (2007). Typically, such associations are stronger for religious salience than religious attendance (Milot & Ludden, 2009); the former might reflect a deeper internalization of religious values than the latter among teens. Still, others have reported statistically non-significant predictive associations for religiosity measures (e.g., Collins, Ellickson, & Bell, 1999; Harden, 2010; Merline, Jager, & Schulenberg, 2008). Mixed findings likely are due, in part, to variations in study features related to sample characteristics and assessment methods. On a more substantive level, it has been suggested that the link between religiosity and substance use may be spurious (e.g., Cochran et al., 1994; Windle et al., 2008); that is, the apparent (unadjusted) association between different dimensions of religiosity and substance use may reflect the influence of common predictors.

Thrill seeking is one plausible common predictor of both religiosity and substance use among adolescents. This notion is evident in Ellis' (1987) arousal theory, which posits that a biological disposition to seek intense stimulation explains the relationship between deviant activities, including substance use, and religiosity. Thrill seeking may lead teens not only toward substance use as a risky activity but also away from religious values and practices that are viewed as conventional and boring (Ellis & Thompson, 1989). Thus, controlling for thrill seeking in statistical analyses may explain either part or all of the observed relationship between religiosity and substance use (e.g., Cochran et al., 1994). Alternatively, the association between religiosity and substance use may reflect a causal influence that persists when adjusting for thrill seeking. Some prior research has revealed persistent influences of both religious salience and religious attendance on adolescent substance use in the face of covariates representative of salient sociodemographic characteristics (e.g., gender) and socialization (e.g., family, peer) influences among teens (Jang & Johnson, 2001; Milot & Ludden, 2009; Sinha et al., 2007); however, further analyses that include thrill seeking are needed.

As another consideration, religiosity dimensions may moderate the impact of thrill seeking on substance involvement. This general hypothesis has been supported with respect to other risk factors. For example, Wills and colleagues (2003) reported that a measure of religiosity buffered the positive impact of life stress on adolescent substance use. Jang and Johnson (2001) found that religiosity had a similar moderating effect in the relationship between neighborhood disorder and illicit drug use among teens. By contrast, Forthun and colleagues (1999) found no significant interaction of religiosity (as indicated by church involvement) and sensation seeking among a sample of college students, but similar tests among teens are needed. The current study helps fill this need by examining the extent to which both religious salience and religious attendance, as separate dimensions of religiosity, moderate the positive impact of thrill seeking on adolescent substance use. Despite having a thrill seeking orientation, some adolescents still may internalize religious values and practices that are incompatible with substance use. Both religious salience and religious attendance, therefore, could buffer the risk for substance use that derives from thrill seeking by, for example, encouraging adolescents to restrict the expression of their thrill seeking tendencies to non-deviant activities.

Religiosity might not only moderate but also may mediate the relationship between thrill seeking and substance use. As noted by Frazier and colleagues (2004), a given variable may operate both as a moderator and a mediator, depending on the theoretical questions being addressed. Having longitudinal data permits an examination of questions regarding not only moderation, which implies interactive effects of religiosity and thrill seeking measures at a particular time point (e.g., baseline), but also mediation, which implies indirect effects of thrill seeking on substance use through changes in religiosity dimensions over time (cf. Kraemer, Wilson, Fairburn, & Agras, 2002). Although sensation seeking can be relatively

stable (Hampson, Andrews, & Barckley, 2008), particularly thrill seeking (Pedersen, 1991), religiosity is a dynamic construct. Both religious salience and religious attendance tend to decrease during adolescence (Desmond, Morgan, & Kikuchi, 2010), perhaps as teens individuate themselves from their family of origin and challenge their own values and practices, at least for a time. Thrill seeking might predict an accelerated decrease in both religious salience and religious attendance among adolescents, for reasons noted above (e.g., religion being viewed as boring). Accelerated reductions of this sort would be expected to increase, in turn, risk for substance use in late adolescence. Addressing this question helps to fill the need for longitudinal studies of the development of adolescent religiosity (Benson, Roehlkepartain, & Rude, 2003).

In summary, this study examines thrill seeking measured in early adolescence and two dimensions of religiosity, religious salience and religious attendance, measured throughout the teen years in relation to late adolescent substance use frequency among a sample of rural youth. Tests of the joint, interactive, and indirect influences of thrill seeking and each religiosity dimension are conducted. Compared to their urban and suburban counterparts, rural teens tend to ascribe more importance to religion and religious activities (Wallace, Forman, Caldwell, & Willis, 2003), yet relatively little longitudinal research on adolescent religiosity in rural settings has been conducted. Across settings, late adolescence is a critical developmental period, as teens prepare for the transition to early adulthood. Adolescent substance involvement during this time, especially when it occurs with high frequency and involves multiple substances (such as alcohol, tobacco, and marijuana), can increase risk for long-term adverse outcomes (e.g., Brown et al., 2008).

Based on reviewed research, it was hypothesized that thrill seeking would positively relate and each dimension of religiosity would negatively relate to substance use. Even when adjusting for thrill seeking in joint analyses (Cochran et al., 1994), it was expected that both religious salience and (separately) religious attendance would have persistent negative influences on the outcome. It was further hypothesized that thrill seeking would interact with both religious salience and religious attendance, such that the early adolescent religiosity measures would buffer the positive influence of thrill seeking on late adolescent substance use (Jang & Johnson, 2001; Wills, Yaeger, & Sandy, 2003). Finally, it was expected that at least part of the impact of thrill seeking on the outcome would be indirect (Hampson et al., 2008; Yanovitzky, 2005), via accelerated decreases in religious salience and/or religious attendance.

Analyses also controlled for six additional predictors of substance use and one variable, parent educational attainment, that is associated with attrition in this longitudinal study. Parent problem drinking was included as a covariate, since it has been shown to be a strong risk factor for adolescent alcohol and other substance use (Chassin, Pillow, Curran, Molina, & Barrera, 1993; Warner & White, 2003). Both early substance use (Warner & White, 2003) and early conduct problems (Ellickson & Hays, 1991; King, Iacono, & McGue, 2004) have been shown to predict increased risk for adolescent substance use, and were included as covariates. Early involvement with substance-using peers is positively related to teen substance use (Hundleby & Mercer, 1987), and was controlled for in this study. Gender was a covariate, and multiple group analyses were conducted to examine possible gender moderation in the relationships under investigation. Although gender differences in the mean levels of substance use (Johnston, O'Malley, Bachman, & Schulenberg, 2009) and religiosity dimensions (Milot & Ludden, 2009) have been reported in adolescence, it was expected that the overall pattern and strength of relationships would be more similar than different for boys and girls (e.g., Milot & Ludden, 2009). Finally, an important feature of this study is that it is a randomized trial of family-focused substance use preventive interventions (Spoth, Redmond, Shin, & Azevedo, 2004); thus, we had an opportunity to

include an indicator of effective family intervention in the analyses. Doing so helped to adjust for intervention-related improvements in parent-child relationship quality and family management practices (Kosterman, Hawkins, Spoth, Haggerty, & Zhu, 1997; Redmond, Spoth, Shin, & Lepper, 1999; Spoth, Redmond, & Shin, 1998), and directly modeled reduced teen substance use (Spoth, Redmond, & Shin, 2001; Spoth, Clair, Shin, & Redmond, 2006). Inclusion of these covariates in the analyses helps to rule out a number of alternative explanations for the findings by adjusting for influences that may account for potentially spurious associations among thrill seeking, religiosity, and substance use.

Method

Sample

When the study began, participants were families of sixth graders enrolled in 33 rural schools in 19 counties of a Midwestern state. Selection criteria for the schools included school lunch program eligibility (at least 15% of district families eligible for free or reduced cost lunches) and community size (populations less than 8,500). Blocked on school size and proportion of students residing in low income households, 11 schools each were randomly assigned to one of three conditions: a minimal-contact control condition, a Preparing for the Drug Free Years (PDFY; Haggerty, Kosterman, Catalano, & Hawkins, 1999) condition, and an Iowa Strengthening Families Program (ISFP; Molgaard & Kumpfer, 1993) condition.

In 1993, all families with sixth graders enrolled in the selected schools were invited to participate. Of the 1,309 eligible families, 667 (51%) agreed to participate in the project and completed pretesting, including 208 control group families, 221 PDFY group families, and 238 ISFP group families. Refusal rates across conditions were similar.

Most families were dual-parent (85%), and the large majority of participants were Caucasian (98.6%). Families had an average of three children. At the outset of the study, the average age of target children was 11.3 years; 52% of these children ($n = 345$) were girls. Nearly all participating mothers (97%) and fathers (96%) completed high school, with over half reporting additional education. The median annual household income was \$33,400 in 1993. Information about religious affiliation was not collected in this study; however, national survey data indicate that the Evangelical Protestant (24%), Mainline Protestant (30%), and Catholic (25%) traditions are most prevalent in this region of the country (The Pew Forum on Religion & Public Life, 2008).

Sample Retention and Quality

Eighty-three percent ($n = 551$) of pretested families participated at posttest (age 12), 71% ($n = 472$) at the 7th-grade follow-up (age 13), 66% ($n = 438$) at the 8th-grade follow-up (age 14), 67% ($n = 447$) at the 10th-grade follow-up (age 16), and 69% ($n = 457$) at the 12th-grade follow-up (age 18). Earlier project reports have documented that (a) the sample was representative of families in the targeted population; (b) the experimental conditions were equivalent at pretest in regard to family sociodemographic characteristics, psychosocial characteristics, and outcomes; (c) there has been no evidence of differential attrition between intervention and control conditions throughout the duration of the study; and (d) there has been little evidence of selective attrition, except for a consistent indication that parents with higher educational attainment were more likely to remain in the study throughout the adolescent assessments (Spoth et al., 1998; Spoth, Goldberg, & Redmond, 1999; Spoth et al., 2001).

Procedures and Interventions

Families actively consenting to participate received information that described the study and were mailed a packet that included an initial questionnaire to be completed by the target adolescent, target mother, and target father of each family. Subsequently, families were visited in their homes to individually complete additional questionnaires. All participants were assured of the confidentiality of their responses. On average, in-home visits lasted 2.5 hours. Each family member was compensated \$10/hour for their participation. Similar procedures were used to conduct a posttest assessment and the follow-up assessments during adolescence. All study procedures were approved by the Human Subjects Review committees at Iowa State University and the University of Washington.

Families assigned to one of the intervention conditions participated in either the five-session PDFY program or the seven-session ISFP. The content and implementation of these interventions has been described in detail elsewhere (Spoth et al., 1998; Spoth et al., 1999; Spoth et al., 2001). Briefly, PDFY is a family competency training program that helps parents communicate clear expectations about substance use, develop effective child management practices, enhance child involvement, reduce conflict, and promote bonding. One of the five sessions incorporates instruction on peer resistance skills and encourages children to attend with their parents. Sessions are about 2 hours in length. In the seven-session ISFP, children and parents participate in separate sessions for the first hour, before joining together in a family session. Sessions focus on helping parents improve communication, develop effective child management practices, and successfully handle conflict. Children learn how to set prosocial goals, cope with stress, and deal with peer pressure. Both programs teach parents how to hold effective family meetings. Families assigned to the minimal contact control condition were mailed four leaflets describing aspects of adolescent development.

Measures

Thrill seeking—Thrill seeking was measured at age 11 as a latent variable with four indicators using items adapted from the Thrill and Adventure Seeking subscale of the Sensation Seeking Scale (Zuckerman, 1994). Specifically, adolescents were asked to indicate how likely they would do each of the following activities, if they had the opportunity and resources: “Parachute jumping or sky diving,” “Hang-gliding,” “Bungee jumping,” or “Riding down a steep hill on a skate board.” Response options ranged from 1 “Very likely” to 5 “Very unlikely.” Responses were recoded such that higher scores represented a greater likelihood of thrill seeking behavior. Each item served as a latent variable indicator. Alpha reliability across the thrill seeking items was .82.

The mean and standard deviation for each thrill seeking item are reported in Table 1. To further illustrate the distribution of these items, 32%, 32%, 42%, and 54% of adolescents indicated that they would be “Very unlikely” to parachute jump/sky dive, hang glide, bungee jump, or skate board down a steep hill, respectively. Responses were fairly evenly distributed across the remaining categories, except for somewhat lower positive endorsements for the skate boarding item. For example, 17%, 15%, 15%, and 7% of adolescents indicated that they would be “Very likely” to parachute jump/sky dive, hang glide, bungee jump, or skate board down a steep hill, respectively.

Religiosity—Two dimensions of religiosity were measured throughout adolescence. *Religious salience* was measured at ages 11, 12, 13, 14, 16, and 18 with the following questionnaire item: “In general, how important are religious or spiritual beliefs in your day-to-day life?” Response options ranged from 1 “Very important” to 4 “Not at all important” and were recoded such that higher scores indicated greater religious salience. *Religious*

attendance was measured at ages 11, 12, 13, 14, 16, and 18 with the following questionnaire item: “How often do you attend church or religious services?” Response options ranged from 1 “More than once a week” to 5 “Never” and were recoded such that higher scores indicated greater religious attendance. As shown in Table 1, test-retest correlations for religious salience ranged from .39 to .66 across the adolescent assessments; those for religious attendance ranged from .49 to .75.

Substance use—Substance use was a three-indicator latent variable capturing frequency of substance use at age 18. Specifically, adolescents were asked to indicate how many times they used marijuana in the past year; responses to this item were coded into one of the following categories: 0 “Never,” 1 “One to three times,” 2 “Four to seven times,” 3 “Eight to twelve times,” or 4 “More than 12 times.” They also were asked to indicate how often they smoked cigarettes in the past year on a scale ranging from 0 “Not at all” to 6 “About two packs a day.” Finally, teens answered a question regarding how often they drank alcohol without their parent’s permission in the past month on a scale ranging from 0 “Never” to 4 “Twelve or more times.” Each item served as a latent variable indicator. As a general guideline, Kline (1998) has suggested that univariate skewness values greater than 3.0 can present problems for latent variable models; for this reason, the alcohol use (skewness reduced from 4.02 to 1.18) and marijuana use (skewness reduced from 3.14 to 2.71) indicators were log transformed prior to conducting the primary analyses. Alpha reliability across the substance use items was .56.

For descriptive purposes, rates of lifetime substance use in the sample at age 18 were compared to corresponding national rates at the time of the study (Johnston et al., 2010). About 70% of the sample reported lifetime alcohol use without a parent’s permission (compared to 80% nationally in 2000) and 55% reported lifetime cigarette use (compared to 62.5% nationally in 2000) at age 18; the rate of lifetime marijuana use was much lower than the national trend at 19% in this sample at age 18 (compared to 48.8% nationally in 2000).

Covariates—*Early substance use* was a dichotomous variable coded 1 for use and 0 for nonuse of any substance (e.g., alcohol, cigarettes, marijuana) at age 11. *Early conduct problems* were measured with 6 self-report items (e.g., mean/cruel, got into fights) from the Child Behavior Checklist - Youth Self-report (Achenbach, 1991) that were averaged to compute an overall scale ($\alpha = .72$). A measure of *parent educational attainment* at Wave 1 (i.e., highest grade of schooling reported by both parents) was also included in the analyses. Seven items from the Iowa Youth and Families Project (Conger & Conger, 2002) were used to measure *parent problem drinking*. Mothers and fathers were asked about the extent to which they experienced several consequences (e.g., family problems) from drinking alcohol in the past 12 months at Wave 1 on a scale ranging from 1 “never” to 4 “often.” Items were averaged separately for mothers ($\alpha = .75$) and fathers ($\alpha = .88$), then standardized and summed to create an overall parent problem drinking scale. *Peer substance use* was a dichotomous adolescent-report variable indexing the presence (coded 1) or absence (coded 0) of any close friends who had used either alcohol, cigarettes, or marijuana in the past year at age 11. *Intervention status* was coded 1 for randomization into either the PDFY or ISFP groups and 0 for randomization into the control group, since the purpose was to control for family intervention, in general, and because prior project analyses have already examined the unique impact of each program (e.g., Spoth et al., 2001). Finally, *gender* was coded 1 “male” and 0 “female.”

Analyses

The primary analyses were conducted using a series of latent growth curve models (LGMs; McArdle & Epstein, 1987; Meredith & Tisak, 1990). First, unconditional LGMs were

estimated to examine the patterns of change in religious salience and (separately) religious attendance, from age 11 to age 18. An unconditional LGM represents a two factor confirmatory factor analysis of the repeated measures data, with an intercept factor that describes the starting point of the “curve” and a slope factor that describes the rate of either increase or decrease over time. Factor loadings for the intercept [1,1,1,1,1,1] and the slope [0,1,2.33,3.67,5.67,8.33] were fixed at values that correspond to linear change across the non-equidistant time points, with the intercept (starting point) set at age 11. The possibility of nonlinear change was examined by adding a quadratic factor [0,1,5.43,13.47,32.15,69.39] to the two-factor unconditional LGMs.

Second, the religious salience and religious attendance LGMs were incorporated into two separate confirmatory factor analyses (CFAs) that included the substance use and thrill seeking factors, as well as the covariates. These models provided an evaluation of the overall measurement structure and an examination of the basic (unadjusted) associations among variables. Third, the conditional LGMs depicted in Figures 1 and 2 were estimated to test the hypothesized predictive associations. Although not shown in the figures, models included an examination of the latent interaction of the religious salience intercept and (separately) the religious attendance intercept with thrill seeking in relation to adolescent substance use.

LGMs were conducted in Mplus 6.1 (Muthén & Muthén, 2010) with the weighted least squares means-variance (WLSMV) estimator. WLSMV estimation is appropriate for models that include categorical indicators (i.e., religious salience, religious attendance, thrill seeking). Analyses incorporated missing data procedures available in Mplus to maximize the use of available data. Moreover, school was specified as a clustering variable to adjust the estimated standard errors and chi-square fit statistics for nonindependence due to nesting within schools. To examine mediation, tests of the statistical significance of indirect effects were conducted using the delta method (Sobel, 1982). In addition to the chi-square statistic, the Tucker-Lewis Index (TLI) and the Root Mean Square Error of Approximation (RMSEA) were used to evaluate model fit. TLI values above .95 and RMSEA values below .06 provide evidence for acceptable model fit (Hu & Bentler, 1999).

Results

Correlations, means, and standard deviations for all study variables are presented in Table 1.

Unconditional LGMs

Religious salience—LGM analyses began with an unconditional model of linear change in religious salience. The two factor linear LGM displayed acceptable fit, $\chi^2(26, N = 667) = 63.40, p < .01, TLI = .995, RMSEA = .046$. The mean and variance of the slope factor were both statistically significant. Results indicated that there was a significant average decrease in religious salience from age 11 to age 18 ($M = -.047, S.E. = .006, p < .05$), with significant variability about the mean ($Var = .007, S.E. = .001, p < .05$). An additional three factor model of quadratic change in religious salience also was conducted to examine non-linear change over time. Results showed that the fit between the data and the quadratic LGM was acceptable, $\chi^2(22, N = 667) = 29.18, p > .05, TLI = .999, RMSEA = .022$, and this model displayed improved fit over the linear LGM, $\chi^2_{\text{difference}}(4, N = 667) = 28.14, p < .05$. Interestingly, however, examination of the parameter estimates in the quadratic LGM showed that neither the mean nor the variance of the quadratic factor was statistically significant, indicating both a non-significant average level of and non-significant variability in quadratic change over time. For this reason, the two factor model of linear change in religious salience was chosen as the final unconditional LGM.

Religious attendance—These same steps were followed to examine change in religious attendance throughout adolescence. In this case, a three-factor quadratic LGM displayed the best fit, $\chi^2 (27, N = 667) = 67.07, p < .01, TLI = .997, RMSEA = .047$, and had readily interpretable growth factors. Whereas the mean of the slope factor was statistically non-significant ($M = .033, S.E. = .018, p > .05$), the variance was statistically significant ($Var = .025, S.E. = .007, p < .01$), indicating significant variability about the average tendency for religious attendance to initially increase a small amount. Results also revealed a negative and statistically significant quadratic factor mean ($M = -.006, S.E. = .002, p < .05$), indicating an average downturn in religious attendance, with significant variability about the mean ($Var = .001, S.E. = .000, p < .01$).

CFAs

Next, a full CFA was conducted that estimated covariances among the religious salience growth factors, thrill seeking, substance use, and the covariates. An identical CFA was conducted for religious attendance. One case was omitted from these analyses due to the presence of missing data on all outcomes. Results showed acceptable fit for the religious salience CFA, $\chi^2 (140, N = 666) = 195.54, p < .05, TLI = .981, RMSEA = .024$, and for the religious attendance CFA, $\chi^2 (132, N = 666) = 171.66, p < .05, TLI = .993, RMSEA = .021$. All factor loadings for the thrill seeking and substance use latent variables were statistically significant ($p < .05$), ranging from .52 to .96 in the religious salience model and .54 to .96 in the religious attendance model. Correlations among the study variables from the religious salience CFA are reported in Table 2; those from the religious attendance CFA are reported in Table 3.

Religious salience—Results showed that thrill seeking had a statistically significant negative association with the intercept but not with the slope of religious salience (Table 2). Both the religious salience intercept and the slope had a statistically significant negative association with substance use. None of the covariates was significantly related to the religious salience slope. Parent education was positively related, whereas gender, early substance use, and early conduct problems were negatively related, to the religious salience intercept.

Religious attendance—Results further indicated that thrill seeking had a statistically significant negative association with the religious attendance quadratic factor (Table 3). None of the religious attendance growth factors was significantly associated with substance use. Parent education was positively related, whereas gender and parent problem drinking were negatively related, to the religious attendance intercept. Although none of the covariates was significantly related to the religious attendance slope, intervention status was positively related to the religious attendance quadratic factor.

Across the models, thrill seeking, early substance use, early conduct problems, and parent problem drinking had statistically significant positive associations with substance use, whereas parent education and intervention status had statistically significant negative associations with the outcome. Gender (male), early substance use, early conduct problems, and peer substance use had statistically significant positive associations with thrill seeking.

Hypothesized LGMs

Then, the hypothesized LGMs depicted in Figures 1 and 2 were estimated. These models represent reparameterizations of the CFAs to examine adjusted predictive relationships among the variables. Each hypothesized LGM was fully saturated, estimating all possible structural paths; therefore, the model fit statistics were identical to those of the CFAs. Here, the focus was on the statistical significance of each path, including the indirect effect of

thrill seeking on substance use through either the religious salience or the religious attendance growth factors. Covariates were included in each model as exogenous variables that were allowed to correlate with thrill seeking and the religiosity intercept, and to predict the endogenous variables. Structural paths among thrill seeking, the religious salience growth factors, and substance use are reported in Figure 1, whereas those involving the religious attendance growth factors are reported in Figure 2. Covariate effects from both models are reported in Table 4. Additional LGM analyses tested for interactive effects of thrill seeking with the intercept of each religiosity dimension, and examined possible gender differences in the associations.

Religious salience—Thrill seeking did not predict growth in religious salience; thus, the indirect effect of thrill seeking on substance use was statistically non-significant ($\beta = -.02, p > .05$). Instead, thrill seeking had a direct positive influence on the outcome (Figure 1). Both the religious salience intercept and slope were statistically significant negative predictors of substance use. Interestingly, these relations were somewhat stronger in the predictive LGM than in the CFA. Regarding the covariates in Table 4, only early substance use had a statistically significant (negative) predictive relationship with the religious salience slope, indicating that early substance use was associated with a faster rate of decline in religious salience during adolescence. Both early substance use and early conduct problems were statistically significant positive predictors of substance use, whereas parent education and intervention status predicted a lower level of substance use in late adolescence. Taken together, the predictors explained an estimated 14% of the variance in the religious salience slope and 31% of the variance in substance use.

Potential interactive effects of thrill seeking and the religious salience intercept on the religious salience slope and substance use were examined using latent interaction procedures available in Mplus. Results showed that neither interaction was statistically significant (results available on request).

A series of multiple group LGM analyses of the model depicted in Figure 1 was conducted to examine potential gender moderation of the relationships under investigation. First, an unconstrained model was conducted that allowed all structural path estimates to vary freely across the two gender groups, $\chi^2(270, N = 666) = 324.55, p < .05, TLI = .976, RMSEA = .025$. Next, a constrained model was conducted that forced each of the 17 path coefficients (gender was excluded as a predictor) to take on the same value for boys and girls, $\chi^2(287, N = 666) = 340.16, p < .05, TLI = .972, RMSEA = .024$. Results from a chi-square difference test using the diffest option in Mplus showed that the constrained model did not fit significantly worse than the unconstrained model, $\chi^2(17, N = 666) = 20.69, p > .05$, indicating that the constraints were tenable and the relationships among variables were similar for boys and girls.

Religious attendance—Thrill seeking was a statistically significant negative predictor of the religious attendance quadratic factor, which in turn was a statistically significant negative predictor of substance use; moreover, the specific indirect effect of thrill seeking on substance use through the quadratic factor was statistically significant ($\beta = .16, p < .05$). Thrill seeking remained a significant positive predictor of the outcome (Figure 2). The intercept and the slope also had statistically significant negative associations with substance use. There was only one covariate effect in relation to religious attendance (Table 4). Intervention status was a statistically significant positive predictor of the quadratic factor, suggesting that the family interventions were associated with a decreased rate of downturn in religious attendance during adolescence. Taken together, the predictors explained an estimated 15% of the variance in the religious attendance slope, 14% of the variance in the quadratic factor, and 35% of the variance in substance use.

Latent interaction analysis was conducted to examine potential interactive effects of thrill seeking and the religious attendance intercept on the endogenous variables of the model in Figure 2. Unfortunately, numerical integration procedures in Mplus that are required for these analyses are computationally intensive, increasingly so as the number of latent variables increases; therefore, the model could not be estimated. As an alternative, a latent interaction model based on a two-factor LGM of linear decreases in religious attendance was conducted. Results failed to reveal any statistically significant interactions (results available on request).

A series of multiple group LGM analyses of the model depicted in Figure 2 was conducted to examine potential gender moderation of the relationships under investigation; however, these models failed to converge, likely due to the small variance of the quadratic factor when modeled as a predictor and an outcome across groups. As an alternative, the religious attendance CFA was examined within a multiple group context. First, an unconstrained multiple group CFA was conducted, $\chi^2(266, N = 666) = 319.36, p < .05, TLI = .990, RMSEA = .025$. Next, a constrained model was conducted that forced each of the 26 covariances that correspond to the structural path coefficients from the model in Figure 2 (excluding gender) to take on the same value for boys and girls, $\chi^2(292, N = 666) = 338.08, p < .05, TLI = .992, RMSEA = .022$. Results from a chi-square difference test using the difftest option in Mplus showed that the constrained model did not fit significantly worse than the unconstrained model, $\chi^2(26, N = 666) = 27.81, p > .05$, indicating that the constraints were tenable and the relationships among variables were similar for boys and girls.

Discussion

The current study examined the joint, interactive, and indirect influences of thrill seeking and each of two dimensions of religiosity, religious salience and religious attendance, in relation to substance use among a sample of rural teens. As expected, thrill seeking had a relatively strong positive association with the outcome. This finding is consistent with prior research documenting that thrill seeking and other dimensions of sensation seeking are robust risk factors for adolescent substance use (Martin et al., 2004; Newcomb & McGee, 1991; Stacy et al., 1993). Although thrill seeking can be expressed in many prosocial ways among teens, a thrill seeking orientation may represent a marker of risk for involvement in antisocial and health compromising activities, including substance use. Thrill seeking teens likely are drawn to substance use, in part, due to the excitement of participating in a proscribed activity.

Results also showed that both the level of religious salience in early adolescence (intercept) and the rate of change in religious salience over the teen years (slope) were associated negatively with late adolescent substance use, and the religious attendance growth factors had negative associations with the outcome, while controlling for thrill seeking (Cochran et al., 1994). It has been suggested that links between religiosity and substance use may be spurious, due to the influence of common predictors of these variables (e.g., Windle et al., 2008). Thrill seeking is one plausible common predictor (Ellis, 1987), since individuals with a thrill seeking orientation are expected to be both less inclined to value religion and more inclined to use substances. Interestingly, however, the influence of religiosity became somewhat stronger after adjusting for thrill seeking and the additional covariates. For example, negative associations of religious attendance with late adolescent substance use, although non-significant in the CFA, were statistically significant in the hypothesized LGM. This pattern of results likely reflects statistical suppression, in which bivariate associations are enhanced in the presence of additional variables (MacKinnon, Krull, & Lockwood, 2000). Further research is needed to determine the degree to which these findings are

replicable or due to sampling fluctuations and/or idiosyncrasies of the modeling framework (Shrout & Bolger, 2002).

Of course, negative associations between religiosity dimensions and adolescent substance use should not be interpreted as providing evidence for causal effects. Although the current analyses included thrill seeking and a number of covariates, the possibility remains that the statistical models excluded potentially important variables (e.g., temperament characteristics). Additional hypothesis-driven tests of potential confounders in the relation between religiosity and adolescent substance use are needed, as are studies that provide adjustment for background characteristics and common predictors using alternative designs and analytic techniques, such as behavioral genetic methods (Harden, 2010).

Still, the current findings are consistent with research that has identified religiosity dimensions as protective factors against substance use among youth (Chitwood et al., 2008; Geppert et al., 2007). These protective benefits may result from the tendency for many traditional religions in the U.S., especially in the rural Midwest, to value law abidance and to proscribe alcohol, cigarettes, and other drug use among adolescents and adults alike. Researchers also have speculated that religion may provide support and coping resources that allow individuals to handle stress and dysphoria that, without such resources, can lead to substance use (Pargament, 1997). In this regard, it is noteworthy that the protective influences of both religious salience and religious attendance were present after controlling for assignment in this prevention trial to family interventions that have been shown to increase family involvement and adolescent coping skills (Kosterman et al., 1997; Redmond et al., 1999; Spoth et al., 1998), as well as decrease adolescent depressive symptoms (Mason et al., 2007). Results further indicated that intervention status was associated with a slower rate of downturn in adolescent religious attendance. Neither PDFY nor ISFP explicitly address religion. However, both interventions do target family involvement; therefore, it is possible that one manifestation of increased involvement in these rural Midwestern intervention families was continued adolescent participation in family-oriented religious activities, such as church service attendance, relative to the steeper decreases observed among control family teens.

Overall, the perceived importance of religion and the frequency of attending religious services declined with age, consistent with prior research (Desmond et al., 2010). Individual differences in the rate of change in these two religiosity dimensions were present in the sample and were associated negatively with substance use in the LGMs. These results confirm the importance of examining the religious and spiritual experiences of adolescents from a dynamic, developmental perspective (Benson et al., 2003).

Contrary to expectations, there was no evidence that religiosity moderated the influence of thrill seeking on adolescent substance use. This is consistent with findings reported by Forthun and colleges (1999) in a sample of college students. By contrast, Wills et al. (2003) and Jang and Johnson (2001) found evidence for a buffering effect of religiosity in regard to the effects of life stress and neighborhood disorder, respectively, on substance use. The thrill seeking component of sensation seeking, which typically is regarded as a biologically-based personality trait (Zuckerman, 1994; Zuckerman & Kuhlman, 2000), may have effects on substance use that are less modifiable than those of other risk factors, such as neighborhood disorder (Jang & Johnson, 2001). Alternatively, other dimensions of religiosity (e.g., religious beliefs) might moderate the impact of thrill seeking on teen substance use. As two of the most frequently studied dimensions of adolescent religiosity (Benson et al., 2003), religious salience and religious attendance were our focus. Studies with broader assessment of the multiple dimensions of adolescent religiosity are needed to examine additional possible moderators within the domain of religion.

Thrill seeking was related negatively to religious salience but was unrelated to religious attendance in early adolescence at age 11 (Figures 1 and 2). If thrill seeking teens view religion as boring and incompatible with their drive for involvement in exciting and intense activities, then they might be less inclined to value religion than their non-thrill seeking counterparts. Early adolescents have some freedom to begin shaping their own personal values, but typically still have limited opportunities for opting out of expected family activities, such as attending church services, which could explain this pattern of findings. By comparison, thrill seeking was unrelated to change in religious salience, whereas it did have a statistically significant negative association with the religious attendance quadratic factor, suggesting that thrill seeking predicted a faster rate of downturn in religious attendance. Typically, traditional religious services require those in attendance to sit quietly and reverently for a period of time, which stands in contrast to the types of activities sought by thrill seeking teens. As their freedom and decision making opportunities increase in late adolescence, teens with elevated thrill seeking tendencies may be more likely than other teens to increasingly avoid religious services. This may lead, in turn, to increased risk for substance use; indeed, results provided evidence for a hypothesized indirect relationship of thrill seeking with substance use through decreased religious attendance. Note, however, that thrill seeking continued to have a statistically significant direct association with substance use. It is likely that other risk and protective processes, such as increasing deviant peer affiliations during adolescence (Hampson et al., 2008; Yanovitzky, 2005), further mediate the link between thrill seeking and substance use. The primary purpose of the current analyses was to focus on adolescent religiosity, with controls for early peer influences; therefore, further longitudinal mediation tests are needed.

The negative association of family intervention with substance use is noteworthy and was fairly robust across the descriptive and substantive analyses, only becoming marginally significant in the full multivariate religious attendance LGM. Prior project findings have documented the positive effects of both PDFY and ISFP in delaying substance initiation (Spoth, Reyes, Redmond, & Shin, 1999) and reducing the quantity and frequency of substance use throughout adolescence (Spoth et al., 2001; Spoth et al., 2006). Mediation analyses have shown that these distal effects are due to proximal intervention influences on improved family functioning and increased adolescent coping and substance use refusal skills (e.g., Mason et al., 2009). Thus, including intervention status as a covariate in the current analyses provided a way to adjust for these intervention-induced family and individual gains, while directly modeling effects on substance use. Also noteworthy is the finding that early substance use was a statistically significant negative predictor of the religious salience slope, indicating that youth with higher levels of use in early adolescence experienced a faster rate of decline in religious salience over the teen years. The relationship of certain religiosity dimensions, especially those that reflect the internalization of religion, with adolescent substance use may be bi-directional (e.g., Benda, 1997). Whereas religiosity may protect against substance use, when substance use does occur it may promote the development of attitudes and behaviors that are increasingly incompatible with religious values and beliefs, resulting in decreased religious salience over time.

Overall, the findings suggest that the pattern of relationships among study variables is similar for boys and girls, at least in this rural adolescent sample. Milot and Ludden (2009) likewise reported more similarities than differences for boys and girls in the relationship between religiosity and substance use in a sample of rural adolescents, and Forthun and colleagues (1999) found little evidence for gender moderation in the associations among religiosity, sensation seeking, and substance use among a sample of college students. Although gender differences in late adolescent substance involvement (Johnston et al., 2010) and in teen religiosity (Milot & Ludden, 2009) are well documented, the basic associations of thrill seeking and religiosity with substance use may represent general developmental

processes that operate comparably for boys and girls; however, additional tests on other samples of teens are needed.

Limitations of this study include the homogeneous nature of the sample, which reflects the rural Midwestern region in which the study was conducted. Findings may not generalize to more diverse samples of teens, such as racial and ethnic minority youth or those from metropolitan settings. In addition, measures for most of the variables in this analysis were based on adolescent self-reports, which could have contributed to bias in the reporting. Religious salience and religious attendance each were measured with a single questionnaire item. Although this has been a common way to measure these two dimensions of religiosity among teens in longitudinal studies, it is now recognized that religiosity is a multidimensional construct (Kendler et al., 2003). As noted, additional studies are needed that draw on multi-item scales to assess religious salience, religious attendance, and other dimensions of religiosity. Likewise, expanded tests of the questions addressed in this study need to be conducted by considering additional dimensions of sensation seeking beyond the thrill seeking component, which were not assessed in the current study (e.g., boredom susceptibility, disinhibition).

Despite these limitations, the contribution of the study is enhanced by a number of strengths, including the relatively large sample, the multi-wave longitudinal design, and the rigorous latent growth curve analyses. Findings have implications for preventive intervention. In particular, results suggest that adolescents could be screened for high levels of thrill seeking (along with other known risk characteristics in the individual, family, peer, school, and community domains) and referred for substance use prevention programming (Sargent, Tanski, Stoolmiller, & Hanewinkel, 2010). Such programming likely needs to adopt an engaging delivery format that will capture the attention of thrill seekers by, for example, drawing on media technology to present information and skill-building exercises in a fast-paced and exciting manner. Indeed, the SENTAR (sensation seeking targeting) approach is one example of this type of programming that has shown effects on reduced marijuana use among high sensation seeking adolescents using a mass media delivery format (Palmgreen, Donohew, Lorch, Hoyle, & Stephenson, 2001). Additional applications of this targeting approach are needed. Furthermore, although the precise nature of the relationship between religiosity and adolescent substance use remains to be determined, acknowledging the importance of religion for some teens involved in substance use prevention programs may facilitate engagement with the materials and help reinforce anti-substance use messages and skill-building exercises. Finally, findings related to intervention status provide further evidence for the positive impact of family-based preventive interventions on reducing adolescent substance use (Kumpfer, Alvarado, & Whiteside, 2003).

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Figure 1.

Latent growth curve model examining thrill seeking and religious salience in relation to adolescent substance use ($N = 666$). Standardized parameter estimates are reported. Covariates (not shown) include parent problem drinking, parent educational attainment, early substance use, early conduct problems, peer substance use, intervention status, and gender. Fixed growth factor loadings: intercept [1,1,1,1,1] and slope [0,1,2.3,3.7,5.7,8.3]. Sal = salience. (1) = reference indicator; * = $p < .05$.



Figure 2.

Latent growth curve model examining thrill seeking and religious attendance in relation to adolescent substance use ($N = 666$). Standardized parameter estimates are reported. Covariates (not shown) include parent problem drinking, parent educational attainment, early substance use, early conduct problems, peer substance use, intervention status, and gender. Fixed growth factor loadings: intercept [1,1,1,1,1,1], slope [0,1,2.3,3.7,5.7,8.3], and intercept [0,1,5.4,13.5,32.2,69.4]. Att = attendance. (1) = reference indicator; * = $p < .05$.

Table 1

Descriptive statistics for the study variables

Measure (age)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Male gender														
2. Parent education	-.01													
3. Early substance use	.06	-.09*												
4. Early conduct problems	.15*	-.10*	.14*											
5. Parent problem drink.	.03	-.16*	.10*	.11*										
6. Peer substance use	.05	.01	.18*	.24*	.05									
7. Intervention status	.01	-.01	.04	.01	.01	-.01								
8. Thrill - Parachute jump	.23*	.02	.07	.16*	.02	.13*	-.03							
9. Thrill - Hang gliding	.25*	.02	.07	.14*	.01	.12*	.01	.79*						
10. Thrill - Bungee jump	.21*	.06	.10*	.09*	-.05	.13*	-.01	.65*	.57*					
11. Thrill - Skate board	.27*	-.08*	.09*	.09*	.03	.09*	.02	.37*	.36*	.39*				
12. Relig. salience (11)	-.12*	.10*	-.11*	-.10*	-.08	-.01	.01	-.08*	-.09*	-.10*	-.10*			
13. Relig. salience (12)	-.13*	.09*	-.05	-.13*	-.07	-.03	.02	-.02	-.05	-.02	-.06	.58*		
14. Relig. salience (13)	-.09	.08	-.09*	-.14*	-.08	-.01	-.01	-.02	-.05	-.07	-.01	.50*	.59*	
15. Relig. salience (14)	-.06	.07	.05	-.06	-.09	.02	-.04	.01	-.03	.02	-.01	.47*	.59*	.66*
16. Relig. salience (16)	-.06	.06	-.11*	-.12*	-.04	.05	-.07	-.03	-.04	-.07	-.02	.49*	.54*	.57*
17. Relig. salience (18)	-.11*	.17*	-.14*	-.08	-.10	.01	-.04	-.02	.01	-.04	-.06	.39*	.49*	.49*
18. Relig. attendance (11)	-.08*	.18*	-.07	-.01	-.15*	.01	-.06	-.03	-.04	-.03	-.02	.51*	.45*	.36*
19. Relig. attendance (12)	-.07	.18*	-.09*	-.01	-.15*	-.01	-.08	.03	.02	.03	.02	.41*	.51*	.41*
20. Relig. attendance (13)	-.08	.16*	-.11*	.01	-.15*	.03	-.08	.02	.02	.04	.02	.42*	.46*	.45*
21. Relig. attendance (14)	-.02	.15*	-.05	.07	-.16*	.05	-.05	.03	.01	.06	-.01	.39*	.47*	.45*
22. Relig. attendance (16)	.02	.14*	-.04	.02	-.17*	.05	-.07	-.04	-.05	-.06	-.04	.26*	.35*	.36*
23. Relig. attendance (18)	-.06	.09	-.03	.01	-.16*	-.01	.09	-.10	-.06	-.07	-.03	.36*	.39*	.34*
24. Marijuana frequency	.04	-.03	.15*	.14*	.12*	.12*	-.10*	.19*	.14*	.18*	.10*	-.15*	-.09	-.07
25. Alcohol frequency	.14*	-.09	.15*	.09	-.06	-.03	-.05	.08	.09	.06	.21*	-.08	-.11*	-.06

Measure (age)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
26. Cigarette frequency	.07	-.20*	.16*	.13*	.09	.01	-.11*	.15*	.11*	.15*	.18*	-.17*	-.13*	-.16*
Mean	.48	13.4	.05	.13	.00	.14	.69	2.71	2.65	2.45	1.95	3.12	3.06	3.02
Standard deviation	.50	1.79	.22	.26	1.46	.34	.46	1.47	1.44	1.51	1.26	.85	.92	.89
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16. Relig. salience (16)	.64*													
17. Relig. salience (18)	.60*	.63*												
18. Relig. attendance (11)	.40*	.47*	.38*											
19. Relig. attendance (12)	.45*	.48*	.42*	.75*										
20. Relig. attendance (13)	.46*	.49*	.39*	.71*	.75*									
21. Relig. attendance (14)	.54*	.50*	.47*	.68*	.68*	.72*								
22. Relig. attendance (16)	.42*	.45*	.35*	.55*	.55*	.54*	.63*							
23. Relig. attendance (18)	.42*	.43*	.50*	.50*	.49*	.49*	.59*	.59*						
24. Marijuana use ^I	-.07	-.21*	-.21*	-.07	-.07	-.07	-.04	-.13*	-.17*					
25. Alcohol use ^I	-.02	-.08	-.15*	.06	-.01	-.01	.01	-.14*	-.17*	.26*				
26. Cigarette use	-.07	-.17*	-.29*	-.07	-.07	-.08	-.12*	-.11	-.20*	.43*	.33*			
Mean	3.01	2.86	2.79	3.12	3.08	3.14	3.09	3.17	2.84	.32	2.06	.91		
Standard deviation	.91	.94	.96	1.31	1.36	1.36	1.38	1.35	1.40	.96	4.28	1.38		

Note. Relig. = religiosity.

* $p < .05$;

^I prior to transformation; Total $N = 667$.

Table 2

Correlations among study variables from the religious salience confirmatory factor analysis ($N = 666$)

Variables	1	2	3	4	5	6	7	8	9	10
1. Gender (male)										
2. Parent education	-.01									
3. Early substance use	.06	-.09								
4. Early conduct problems	.15*	-.10*	.14*							
5. Parent problem drinking	.03	-.17*	.10*	.12*						
6. Intervention status	.01	-.01	.04	.01	.01					
7. Peer substance use	.05	.01	.19*	.24*	.05	-.01				
8. Thrill seeking	.31*	.03	.10*	.15*	.01	-.02	.15*			
9. Religious salience intercept	-.13*	.09*	-.07*	-.14*	-.09	.01	-.02	-.11*		
10. Religious salience slope	.02	.07	-.09	.03	-.02	-.09	.09	.10	-.32*	
11. Substance use	.11	-.18*	.24*	.20*	.13*	-.14*	.07	.30*	-.20*	-.24*

* $p < .05$.

Table 3

Correlations among study variables from the religious attendance confirmatory factor analysis ($N = 666$)

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Gender (male)											
2. Parent education	-.01										
3. Early substance use	.06	-.09									
4. Early conduct problems	.15*	-.10*	.14*								
5. Parent problem drinking	.03	-.17*	.10*	.12*							
6. Intervention status	.01	-.01	.04	.01	.01						
7. Peer substance use	.05	.01	.19*	.24*	.05	-.01					
8. Thrill seeking	.31*	.03	.10*	.15*	.01	-.02	.15*				
9. Religious attendance intercept	-.10*	.18*	-.10	-.02	-.17*	-.06	-.01	-.02			
10. Religious attendance slope	.11	-.06	.03	.20	-.02	-.15	.18	.18	-.20*		
11. Religious attendance quadratic	-.06	-.01	-.01	-.16	.01	.23*	-.16	-.24*	-.03	-.85*	
12. Substance use	.11	-.18*	.24*	.20*	.13*	-.14*	.07	.30*	-.06	-.01	-.18

* $p < .05$.

Table 4
Standardized Path Estimates for the Covariates from the Religious Saliency and Religious Attendance LGMs

Predictor	Outcome			
	Slope	Substance Use	Slope	Substance Use
	Religious Saliency Model (N= 666)		Religious Attendance Model (N= 666)	
Gender (Male)	-.04	-.03	.02	.02
Parent education	.08	-.11*	-.03	.01
Early substance use	-.12*	.14*	-.03	.04
Early conduct problems	-.01	.10*	.15	-.11
Peer substance use	.10	-.01	.12	-.11
Parent problem drinking	-.03	.06	-.09	.02
Intervention status	-.08	-.17*	-.16	.23*

* $p < .05$.