Final Report

Religion and Sexual Risk Taking in Youth

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This research used the National Longitudinal Study of Adolescent Health (Add Health) data base to analyze the relationship between religion and adolescent sexual risk behavior. All of the aims of the research program were accomplished. We have written six papers that are currently under editorial review in scientific journals. Two of the papers are short because we wrote them to appear in "Brief Report" sections of scientific journals. The details of the studies can be found in the appended articles and are not elaborated here. Our goal in this report, instead, is to provide a "big picture" perspective on the studies as a whole. Policy implications of the research program are summarized in the concluding section.

The Common Belief that Religion is Protective for Adolescent Sexual Risk Behavior

Religion is widely seen as protective with respect to adolescent problem behaviors in general and adolescent sexual risk taking in particular. The negative association between religiosity and adolescent sexual activity is fairly robust and is the basis for conclusions that religiosity is protective. However, most research that has reported this association has used cross sectional designs with convenience samples. They have been inconsistent in which covariates are statistically controlled when estimating model parameters. This means that the often observed negative association between religiosity and sexual risk behavior is on somewhat shaky scientific grounds and needs closer scrutiny. We gave it such scrutiny.

Alternative Explanations of the Negative Association between Religiosity and Adolescent Sexual Risk Behavior

There are many plausible alternative explanations of the negative association between adolescent religiosity and adolescent sexual risk behavior. For example, as adolescents get older, many become less religious. As they get older, adolescents also are more likely to engage in sex, perhaps for reasons that have nothing to do with religiosity. Thus, the negative association between religiosity and sexual risk taking may reflect, in part, the spurious effects of the age of the adolescent. Unless age is statistically held constant, or unless a narrow age range of youth are studied, conclusions about the relationship between adolescent religiosity and sexual risk behavior are clouded.

In our research, we explored two intriguing confounds/alternative explanations other than age. The first alternative explanation was that the negative association is not because religiosity influences sexual behavior, but, instead, that the causal influence is in the opposite direction: Once adolescents start to engage in sexual activity, they begin to pull away and distance themselves from institutions that disapprove of such activity, such as religious organizations. In essence, they adjust their religious attitudes to conform to their past behavior. We found some support in our research for the operation of such dynamics.

Another mechanism we explored was the confound between maternal religiosity and adolescent religiosity. Religious mothers tend to have religious children. We speculated that religious mothers parent differently than non-religious mothers and that these differing parenting styles may impact adolescent sexual behavior. If we control for the fact that (a) adolescent religiosity is correlated with maternal religiosity and (b) that religious mothers parent differently than non-religious mothers, then the relationship between *adolescent* religiosity and sexual risk behavior may weaken or even vanish. We also found some support for this dynamic.

Our research found some evidence consistent with protective effects of religiosity, but these effects depended on the facet of sexual risk behavior of interest. With aggressive controls for confounds and using prospectively measured outcomes, adolescent religiosity and attendance at religious services were either not significantly related to or were associated with *higher* levels of risk behavior for the use of birth control at one's most recent intercourse, condom use consistency, the occurrence of a pregnancy during adolescence, and testing positive for an STD in young adulthood. These religious variables were, however, associated with lower levels of sexual activity and fewer sexual partners, but only for the most religious adolescents and for those who were the most ardent attendees of religious services. Some of these significant effects were weak, while others seemed more substantial.

Scientific Implications. Our research underscores that scientists need to exercise caution when making substantive inferences about the mechanisms underlying the often observed negative association between religiosity and adolescent sexual risk behavior. We have been too quick to attribute protective mechanisms as the basis for the negative association between religiosity and sexual risk behavior.

Intervention Implications. Faith-based programs are an important outreach strategy to address the problem of adolescent pregnancy. We need to help make such programs effective in reducing adolescent pregnancies, bringing scientific research to bear in program design. Some faith-based efforts are based on the assumption that if they appeal to and strengthen religiosity in adolescents, that this will reduce sexual risk behavior. Although there is some evidence consistent with this assumption, for some facets of sexual risk behavior, our research indicates that such a strategy is likely to have little or weak effects at best. Adolescence is complex and the determinants of sexual risk behavior are just as complex. The message to faith-based programs is that their efforts must extend beyond matters of faith if they are to be effective. This in no way lessens the importance of faith-based outreach. It merely underscores that these programs need to be multi-faceted if they want to make a meaningful difference.

Denominational Differences in Adolescent Sexual Risk Behavior: Denomination Matters

Our research also examined base rates in adolescent sexual risk behavior for 22 different religious denominations. We observed dramatic differences across the denominations. For example, whereas 2% of Mormon female adolescents and less than 1% of Jewish female adolescents had experienced a pregnancy, over 11% of female Baptist adolescents had done so. Whereas 3% of adolescent Lutherans tested positive for an STD in young adulthood, almost 29% of adolescent Christian Scientists tested positive for an STD in young adulthood. There is, of course, a host of social and demographic confounds between these groups. Few Mormons and Jews are Black, whereas a substantial number of Baptists are Black. When such confounds are controlled, many of the denominational differences weaken, but there remains substantial variation in several cases.

We pursued contrasts that compared adolescents in different denominations with adolescents who chose not to affiliate with any religion. The logic was that if the sexual base rates of adolescents who eschew religion are comparable to those adolescents who affiliate with a given denomination, then one might characterize participation in that denomination as "not protective." After controlling for a host of demographic confounds, we found a mixed picture, depending on the facet of sexual risk behavior in question. For example, most of the studied denominations were deemed "protective" for engaging in sexual activity, but most were not "protective" in terms of the use of birth control or for testing positive for an STD during young adulthood.

Scientific Implications. It is common in scientific modeling to include religiosity as a covariate when estimating structural coefficients. Religious denomination should be included as well. Denominational differences exist in sexual behavior even when religiosity is statistically held constant. Denominational differences in sexual activity are understudied. Instead, most of the scientific attention is on religiosity. Denominational differences and generalizability of effects across denominations should be subjected to greater scientific study, especially since faith-based outreach usually will be implemented within a given denomination.

Intervention Implications. Certain types of adolescents affiliate with certain denominations. Faith-based outreach typically will be structured on denominational lines, i.e., Catholic religious organizations will outreach to Catholic youth, Mormon religious organizations will outreach to Mormon youth, and so on. The structure of faith based outreach efforts needs to take into account the selection effects that link different adolescent populations to different denominations. For example, as Baptist religious leaders outreach to youth in their congregations, they will invariably be reaching out to a significant segment of Black Americans. As the leaders of the Latter Day Saints reach out to youth in their congregations, they will be reaching out to youth with a somewhat more affluent advantage. Based on the results of our research, a "one-size fits all" approach to faith-based outreach is likely to be sub-optimal.

Religiosity versus Specific Religious Beliefs: The Paradox of Belief in Guardian Angels

Most studies of religion and adolescent sexual risk behavior focus on global variables, such as religiosity and church attendance. However, beliefs surrounding religion are varied and specific facets of religious ideology are important to study in their own right. This was illustrated in a set of analyses we conducted on beliefs in guardian angels during late adolescence/young adulthood. Holding global religiosity and a host of demographic confounds constant, we found that unmarried youth who strongly believed there was a guardian angel watching over them were *more* likely to test positive for a sexually transmitted disease and to have *more* sexual partners. Contrary to the global variable of religiosity, this particular religious belief behaved as if it was risk-inducing rather than protective.

Scientific Implications. Scientists need to move beyond the analysis of global indicators of religiosity to focus on more strategic analyses of religious beliefs. Our results underscore the idea that religious variables operate in far more nuanced ways than current social science theories allow. We need to better understand those features of religion that promote positive youth development and those features of religion that have (often unanticipated) negative consequences for youth.

Intervention Implications. Faith-based outreach needs to appreciate that appeals to religious concepts can have both protective and risk-inducing effects in youth. We suspect, but could not test, that a certain degree of fatalism and external locus of control becomes salient to youth when the construct of a guardian angel is emphasized. Faith-based outreach efforts need to be sensitive to such possibilities and teach youth techniques for negating such adverse effects, while remaining true to the religious ideals embraced by the overarching religious doctrine.

Tailoring Faith-Based Outreach Efforts: How Youth Who Attend Religious Services Differ from Youth Who Do Not Attend Religious Services

More often than not, faith-based programs will reach youth who attend religious services on a regular or semi-regular basis. As religious leaders structure programs to outreach to youth

who attend religious services, it is important for them to understand the kinds of beliefs and attitudes that underlie the behavior of their target audience. We focused analyses on two classes of adolescent beliefs, a set of beliefs related to engaging in sexual intercourse, and a set of beliefs related to using birth control. We studied how these beliefs differed as a function of church attendance and whether the structural coefficients linking the beliefs to sexual behavior varied as a function of church attendance. The goal was to identify the unique characteristics of youth who attend church on a regular or semi-regular basis, thereby providing religious leaders with a better sense of their target population.

With a few exceptions, we found that the structural coefficients linking beliefs about the advantages and disadvantages of engaging in sexual intercourse to sexual activity did not vary much as a function of frequency of attendance at religious services. This also was true for analyses that linked contraceptive related beliefs to the use of contraception. These findings suggest that the kinds of motivations and attitudes influencing sexual activity and the use of birth control are roughly the same for adolescents who attend religious services frequently as they are for those who do not. As such, faith-based programs should be able to draw upon the approaches and strategies used in extant evidence-based programs for preventing adolescent sexual risk behavior, and these strategies should be as effective as they are in the general population. To be sure, we found that youth who frequently attend religious services are more likely to endorse or disavow a wide range of beliefs about engaging in sex relative to the general population. However, the dynamics by which these beliefs translate into behavior are, based on the analysis of structural coefficients, comparable for youth who attend religious services often relative to those who do not.

An important and unanticipated non-religious related result that emerged from our research was an inverse relationship between contraceptive efficacy beliefs and the use of birth control at one's most recent intercourse: The more confident that youth were in their ability to plan ahead, their ability to stop and use birth control if highly aroused, and their ability to get a partner to use birth control, the *less* likely they were to use birth control. This finding is consistent with an over-confidence effect, whereby adolescents think they have the skills to do these things in the abstract, but when placed in an actual situation where such skills are required, it turns out to be much harder than the adolescent realized.

Another interesting result was the fact that many of the beliefs focusing on the positive consequences of engaging in sex were the strongest correlates of future sexual behavior. For example, some of the strongest predictors were the positive social and relationship implications of having sexual intercourse, as well as the physical pleasures of doing so. These topics are rarely addressed in interventions. Instead, the focus tends to be on unintended pregnancies and sexually transmitted diseases. Our research indicates that faith based interventions (as well as interventions more generally) need to broaden their focus to take into account such variables. It is not enough to bombard adolescents with information about the negative consequences of sexual intercourse. Rather, we must be attuned to the "attractors" that are operating and help adolescents put these in proper perspective.

Scientific Implications. Few studies have examined how the structural coefficients relating possible determinants of sexual risk behavior to risk outcomes vary as a function of attendance at religious services. Attendance tends to be viewed as a proxy for religiosity rather than a variable of interest in its own right. Scientific research on moderated relationships that use church attendance as the target moderator variable will add important information to our knowledge base of the role of religious variables in determining adolescent sexual risk behavior.

Intervention Implications. The results of our research suggest that (a) faith-based approaches can usefully draw upon extant evidence-based programs to reduce early sexual activity, (b) that although the target populations of faith based efforts will tend to espouse beliefs that are more conducive to lower levels of sexual activity, these beliefs can still be strengthened to good effect, (c) that interventions need to address the "attractors" for sexual intercourse, not just issues surrounding pregnancy and STDs, and (d) that over-confidence effects need to be dealt with when addressing contraceptive efficacy

Limitations of the Research

All of the above observations must be qualified by the methodological limitations of the Add Health data set upon which the studies were based. As a broad-based national survey, Add Health did not probe topics in depth. As such, the religious variables are somewhat limited. For example, current day theories of religiosity make distinctions between intrinsic and extrinsic religiosity. Extrinsic religiosity refers to cases where engagement in religion is motivated by social factors (meeting friends) and factors that have little basis in religious doctrine. Intrinsic religiosity refers to cases where engagement in religion is motivated by religious conviction and doctrine. Add Health did not include such measures. Other limitations specific to each study are discussed in the manuscripts describing those studies.

Summary of Policy Implications

In sum, the major policy implications of our research program are

- Faith-based programs to reduce adolescent sexual risk behavior are yet another potential tool to address the serious and nagging problem of unintended pregnancies in the United States

- The dynamics underlying the often observed negative association between adolescent religiosity and sexual risk behavior are far more complex than is commonly assumed. There is evidence that some of the association is due to confounds with parental religiosity and the parenting styles of parents. In addition, there is evidence that some of the association is due to sexually active adolescents distancing themselves from religion.

- The protective effects of religiosity vary depending on the facet of sexual risk behavior. For some facets of sexual behavior (e.g., sexual activity), religiosity seems to have some protective value, but for other facets of sexual activity (e.g., use of birth control), this is not the case.

- Faith based interventions cannot rely simply on appeals to strengthen or make salient religiosity in adolescents. Our research shows that faith-based outreach must address many of the same considerations that are addressed in extant evidence-based programs. Efforts must extend beyond matters of faith if they are to be effective to a meaningful extent. This conclusion does not lessen the importance of faith-based outreach. It merely underscores that these programs need to be multi-faceted to make a difference.

- There are sizeable differences in adolescent sexual risk taking as a function religious denomination. Some differences can be attributed to demographic confounds, but even when such confounds are controlled, denominational differences in sexual risk taking are

non-trivial. Faith-based outreach typically is structured on denominational lines. A "one-size fits all" approach to faith-based outreach is likely to be sub-optimal, given the substantial self-selection effects that operate as families choose a religion with which to affiliate.

- Certain facets of religion are protective and certain facets are risk inducing. For example, belief in a guardian angel is associated with *higher* levels of testing positive for STDs. Faith-based outreach needs to be sensitive to the multifaceted nature of religious ideology and the differential effects that facets of religion can have.

- Faith-based programs are most likely to reach adolescents who attend religious services on a regular or semi-regular basis. The ways that such youth construe sexual activity and birth control are distinct from the general population in many ways. Despite this, the structural coefficients linking sexual attitudes to sexual behavior are similar for those who attend church frequently and those who do not. Given this, faith-based programs can fruitfully draw on extant evidence-based programs in their efforts to reduce adolescent pregnancy.

Appendices

Does Religiosity Reduce Adolescent Sexual Behavior or

Does Adolescent Sexual Risk Behavior Reduce Religiosity: A Longitudinal Analysis

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Abstract

      The relationship between religiosity and sexual activity was examined for a nationally representative sample of adolescents in a prospective design. Structural equation modeling analyses were used to explore a possible reciprocal relationship between these variables in a two wave panel design. Data consistent with reciprocal causality were observed, consistent with the theory of cognitive dissonance. Adolescents showed evidence of withdrawing from religious orientations after engaging in sexual activity. This tendency was found to be larger for girls than boys.

Does Religiosity Reduce Adolescent Sexual Behavior or Does Adolescent Sexual

Risk Behavior Reduce Religiosity: A Longitudinal Analysis

Adolescent sexual behavior has been of interest to social scientists and policy makers for decades. With approximately 19 million new cases of sexually transmitted diseases in the United States each year, the age group of 15 to 24 year-olds accounts for nearly half of the infected population (Grunbaum et al., 2004). Adolescent pregnancies have been on the decline since 1995 (Santelli, Lindberg, Finer, & Singh, 2007), but they have increased in recent years and remain at unacceptably high levels costing the United States economy billions of dollars each year (Jaccard, 2009).

One variable that has received considerable research attention as a protective factor for adolescent sexual behavior is that of religiosity. Though there are exceptions, it generally has been found that as adolescent religiosity increases, sexual activity tends to decrease (e.g., Rostosky, Regenerus, & Wright, 2003). Studies also have found links between religiosity and sexual risk behaviors other than the frequency of sexual intercourse. For example, Miller and Gur (2002) found that church attendance, personal devotion, and institutional conservatism were associated with a decreased number of sexual partners in the previous year.

Most research linking religiosity to adolescent sexual behavior has been cross-sectional in nature. Rostosky, Wilcox, Wright, and Randall (2004) conducted a meta-analysis of longitudinal studies predicting adolescent sexual behavior from religious variables published between 1980 and 2000, and found only 10 longitudinal studies. Based on an analysis of these studies, Rostosky et al. concluded that religiosity was associated with delays of coital debut, though these results were more consistent for females than for males.

 Research on religiosity and sexual intercourse has tended to assume that religiosity impacts sexual behavior. However, an alternative interpretation reverses this causal dynamic. According to this logic, as adolescents engage in risk behaviors, they start to distance

themselves from contexts (school, family, religion) that discourage those behaviors. Cognitive dissonance theory (Fazio, Zanna, & Cooper, 1977) predicts, for example, that adolescents will decrease their religiosity as they reconcile the disparity between their religiosity on the one hand and their sexual activity on the other. These reverse-causal dynamics can produce the frequently observe negative association between religiosity and sexual behavior, but it is not because being religious is protective. Rather sexual activity influences religiosity.

A few studies have addressed the possibility of reciprocal causation between religiosity and sexual behavior. Thornton and Camburn (1989) explored the possibility and observed data consistent with the proposition that religiosity affects the transition from virgin status to sexual activity. However, they also found that while permissive attitudes regarding premarital sex negatively influenced religious involvement, there were no definitive findings linking first intercourse to subsequent religiosity. However, this study was limited because of its cross sectional nature, its small and non-representative sample, and measurement shortcomings surrounding the retrospective nature of the measures (see Meier, 2003, for elaboration).

Meier (2003) used a prospective design with a national sample of adolescents aged 15 to 19. The study selected for analysis only virgins and used measures of religiosity at baseline to predict transitions to sexual activity in the ensuing year. Meier used the measure of onset of sexual activity to predict religiosity change scores that subtracted religiosity at baseline from religiosity one year later. Meier found an inverse association between baseline measures of religiosity and transitions to sexual activity for females in the ensuing year, but not for males. Additionally, Meier observed a non-significant relationship between whether the adolescent transitioned to sexual activity and changes in religiosity, suggesting reductions in religiosity as a function of sexual activity did not occur. Meier's analysis suffers from several weaknesses. First, by selecting for analysis only the subset of adolescents who were virgins, Meier eliminated adolescents who had already engaged in sexual intercourse and who were sexually more precocious. The sample was thus biased towards more conservative youth who had delayed

sexual intercourse relative to the more general population. Second, because religiosity at baseline is highly positively correlated with religiosity at follow-up, the religiosity change scores are subject to measurement error (i.e., unreliability; see Cronbach & Furby, 1970). This yields attenuated estimates of the relationship between onset of sexual activity and changes in religiosity. Finally, Meier did not allow for the possibility that the effects of sexual activity on religiosity might differ as a function of ethnicity (Wilcox et al., 2001; Sinha, Cnaan, & Gelles, 2007). To the extent that such interaction effects operate (which is likely), the models are mis-specified and may mask relationships.

Hardy and Raffaelli (2003) used two waves of data separated by two years but, like Meier, focused only on virgins between the ages of 15 and 16 (again introducing bias towards a more conservative sample). They found that religiosity as measured at wave 1 was inversely associated with transitions to sexual activity between waves 1 and 2. However, the transitions to sexual activity did not significantly predict religiosity at wave 2, holding constant religiosity measured at baseline.

Benda and Corwyn (1997) used two stage least squares regression analysis to examine reciprocal influence between sexual activity and religiosity in a cross sectional design. They found a non-significant structural coefficient from religiosity to the frequency of sexual intercourse but a statistically significant and negative structural coefficient for frequency of sexual intercourse influencing religiosity. These data are consistent with the proposition that sexual activity influences religiosity rather than vice versa.

In sum, few studies have explored reciprocal causal dynamics between religiosity and adolescent sexual behavior. Those studies that have done so report mixed results. There are non-trivial selection biases in many of these studies (toward more conservative adolescents) and several of the studies either failed to explore or lacked statistical power for exploring gender and ethnic differences in structural coefficients. The present study used a large, nationally

representative sample of adolescents in a two wave panel design coupled with structural

equation modeling to explore reciprocal relationships between sexual activity and religiosity.

.   It has been argued by several social scientists that religion has special significance in the

lives of marginalized groups, such as Latinos and African Americans, because it serves as an

additional form of support when dealing with the stresses and strains of marginalization (George

et al., 2000). As such, when African American and Latino adolescents engage in sexual activity,

this can create a stronger sense of conflict, or in the language of dissonance theory, greater

dissonance from the conflict between religiousness and sexual behavior. As a result, one might

expect greater levels of adaptation of religious orientations as a result of sexual activity for

adolescents in marginalized groups, as they deal with these higher levels of conflict and

dissonance. Another purpose of the present research was to test for ethnic differences in the

structural coefficients of models of joint influence.

The model that guides the analysis is presented in Figure 1. Sexual behavior and the self

reported importance of religion are measured at time t. At time $t+1$ (one year later), the

variables are assessed again. Path a estimates the effect of religiosity as measured at time t on

sexual activity at time $t+1$, holding constant the effects of previous sexual activity. Path b

estimates the effect of sexual activity measured at time t on future religiosity, holding constant

the effects of previous religiosity. To the extent that religiosity is protective for sexual activity in

the ensuing year, path a should be non-zero and statistically significant. To the extent that past

sexual behavior leads to adjustments in religious orientations in the ensuing year, path b should

be non-zero and statistically significant. The present research tests these predictions.

<div align="center">Method</div>

Respondents

The study used data from the National Longitudinal Study of Adolescent Health (Add

Health; Bearman, Jones, & Udry 1997). This is a large scale, nationally representative school

based sample of 20,745 adolescents who were interviewed in grades 7 to 12. The sampling

frame was based on a random sample of 80 high schools stratified by region, urbanicity (urban/suburban/rural), school type (public/private/parochial), ethnic mix, and size. For each high school, a set of "feeder" schools, which included 7th and 8th graders, was identified. Some high schools included grades 7 to 12 and functioned as their own feeder school. A total of 134 discrete schools were studied.

Approximately 200 adolescents were selected from each of the schools, including several strategic over-samples (e.g., Blacks with parents who had a college degree). Sampling weights were derived by Add Health statisticians to permit inferences for a nationally representative sample. A parent, in most cases the resident mother, was asked to complete a questionnaire covering topics that overlapped with the adolescent questionnaire as well as information about the economic status of the household.

Procedure

In-home interviews were conducted with students. Data were recorded on laptop computers. The interviewer read the questions and entered the respondent's answers. For more sensitive sections, the respondent listened to prerecorded questions through earphones and entered the answers directly (audio-CASI). Respondents were reassured of the confidentiality of there responses and could skip any questions that they felt uncomfortable about answering. Adolescents and parents were interviewed separately.

The interview included a wide range of topics including health status, health facility utilization, nutrition, peer networks, decision-making processes, family composition and dynamics, educational aspirations and expectations, to name a few.

Adolescents were interviewed a second time (Wave 2) approximately 1 year after the first interview. Respondents who were in grade 12 during Wave 1 were not interviewed at Wave 2, hence they are not included in this analysis. No significant attrition biases were observed across waves on a range of demographic variables, with sampling weights adjusting for attrition

and missing data across waves. For methodological details, see the Add Health website at

www.cpc.unc.edu/addhealth**.**

Measures

    Religious Importance. At Wave 1, religious importance was measured with the question,

"How important is religion to you?" Responses were scored 1 = "not at all important," 2 = "fairly

unimportant," 3 = "fairly important," and 4 = "very important." Church attendance is often used

as a proxy for religiosity and it was measured as well. Respondents were asked "In the past 12

months, how often did you attend religious services?" Responses were 1 = "never," 2 = "less

than once a month," 3 = "less than once a week but at least once a month," 4 = "once a week or

more." The correlation between religiosity and attendance was substantial ($r = .68$, $p < .01$).

All analyses reported below used the religious importance measure, but they were replicated

using the attendance measure. All conclusions in both sets of analyses were the same.

    Sexual Behavior. At Wave 1, respondents were asked whether they had ever engaged

in sexual intercourse (i.e. virgin status). At Wave 2 (one year after Wave 1), respondents were

asked if they had engaged in sexual intercourse since the prior interview, using time-line follow-

back procedures. The Wave 2 questions allowed us to determine if adolescents had engaged

in sexual intercourse in the year ensuing the baseline survey.

Analytic strategy

    Add Health employed a stratified cluster sampling design in which schools were sampled

from the Quality of Education Database. Student-level sampling weights were calculated by Add

Health statisticians (Tourangeau &Shin, 1998). These weights were used to derive parameter

estimates and standard errors in the statistical models. The community from which the school

was sampled served as the primary sampling unit (PSU).

    The model in Figure 1 was tested using M Plus, a program for structural equation modeling

that permits the use of sampling weights. The models were evaluated using both weighted and

unweighted estimation and all conclusions in both analyses were comparable. The results

reported are from the weighted analyses. The index of sexual behavior at wave 2 was a dichotomous outcome, so it was modeled using the SEM equivalent of logistic regression. All analyses used robust estimation based on a maximum likelihood sandwich estimator (Muthén, 2007). Missing data were accommodated using a full information maximum likelihood method (Honaker, Joseph, King, Scheve, & Singh, 2003).

Gender and ethnic differences in structural coefficients were tested using traditional multi-group solution methods in SEM. These tests calculated chi squared difference tests between an unconstrained model and a model that imposed equality constraints in path coefficients across groups. The chi square difference tests used scaling adjustments given the use of robust estimators. In all models, covariates were included for all endogenous variables, including parental income, maternal education and age.

Model fit was evaluated using both global fit indices (the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the standardized Root Mean Square Residual (RMR)) and more focused indices of fit based on modification indices.

Results

Table 1 presents descriptive statistics on the key model variables as measured at both waves 1 and 2.

We tested the fit of the model in Figure 1 for males and females separately with no across group constraints. We observed good model fit. The RMSEA was 0.01, the CFI was 1.00, and the standardized RMR was 0.002. We then repeated the analyses introducing equality constraints on each path, pairwise, to test for differences in structural coefficients as a function of gender. Table 2 presents the path coefficients for each gender and the contrasts that were statistically significant in the constrained runs. It can be seen that both of the key path coefficients were statistically significant for males, as well as females. That is, the path linking religiosity to future sexual behavior (path *a*) was statistically significant in accord with religion being protective, and the path from having transitioned to sexual intercourse and future

religiosity (measured one year later) was statistically significant, in a direction that suggests lowered religiosity with transitions to sexual activity. The strength of this latter path was statistically significantly stronger for females than it was for males, suggesting that greater adaptation of religiosity took place for adolescent girls as opposed to boys.

A similar analytic strategy was used to evaluate the model in Figure 1 as a function of ethnicity. The unconstrained, multi-group model yielded good fit as indexed by the global fit indices. The RMSEA was 0.02, the CFI was 0.99, and the standardized RMR was 0.004. Table 2 presents the parameter estimates for the model as a function of ethnicity, as well as the results of the group contrasts comparing the magnitude of the path coefficients.

For European American (White) and Latino youth, both of the key path coefficients were statistically significant. In each case, the path coefficients were consistent with (a) religiosity being protective against sexual activity in the ensuing year, and (b) with religious adaptation in the form of reduced religiosity given transitions to sexual activity. For African American (Black) and Asian youth, neither of the key path coefficients was statistically significant.

<div align="center">Discussion</div>

Research tends to observe a negative association between religiosity and adolescent sexual risk behavior. The traditional interpretation is that this association is due to the protective effects of religiosity. The present research suggests that part of this association is due to the effects of sexual activity on religiosity rather than vice versa. Once adolescents transition to sexual activity, they may withdraw from religion as they embrace a lifestyle that is counter to religious teachings. Having engaged in sexual activity, adolescents may experience conflict or dissonance between their actions on the one hand and their religious attitudes on the other hand. Dissonance theory suggests that it is easier for adolescents to reduce this dissonance by changing their religious attitudes than by denying they have engaged in the behavior (Festinger & Carlsmith, 1959). As a result, sexual activity can lead to adaptation of religious orientations in the form of reduced religiosity to make these attitudes more consonant with past behavior.

The present research found that such religious adaptation tended to be stronger for adolescent girls than for adolescent boys. This may be due to the fact that societal norms and pressures to refrain from sexual activity are stronger for girls than they are for boys (Jaccard & Dittus, 1991). In some ways, transgressing has more implications for girls than for boys, so adolescent girls probably experience more conflict and dissonance once they have transitioned to sexual intercourse. Dissonance theory would then predict that they will react to these greater levels of dissonance by rejecting religion that much more. Having said that, it also is important to note that there was some evidence that religion was protective against future sexual activity for both boys and girls, and about equally so.

Another interesting result was the observed ethnic differences in the relationship dynamics between religiosity and adolescent sexual activity. Religiosity was not a statistically significant predictor of future sexual activity for African American or Asian youth, but it was for European American and Latino youth. Similarly, evidence for religiosity adaptation as a function of prior sexual activity was not apparent for African American or Asian youth, but it was for European American and Latino youth. Although these trends are suggestive of a complex pattern of ethnic differences worthy of study in future research, the only coefficient contrast that was statistically significant was for the path coefficient linking religiosity to future sexual activity for European Americans (logistic coefficient = 0-0.14, $p < 0.05$) as opposed to African Americans (logistic coefficient = 0.01, ns). This result is somewhat surprising in light of the central role that religion is thought to have in African American communities. It may be the case that for high school aged youth, the economic, educational, social, and institutional disadvantages that African American youth experience and other features of their cultural experience overwhelm any protective influence that religion has in their lives, at least with respect to engaging in sexual intercourse

The results of this study must be interpreted within the constraints of its methodological limitations. The outcome measure of sexual activity was based on a self report, which can be

biased. Measurement and specification error can bias parameter estimates. The data were correlational and do not permit causal inference. The time interval between the measurement of constructs at time 1 and those at time 2 (1 year) may not have been optimal for characterizing the longitudinal influences of variables. Despite these limitations, the results are interesting and suggest that associations between religiosity and sexual activity should not be entirely attributed to a presumed causal influence of religiosity on sexual activity (because a reverse causal mechanism may account for some of the association), and that the dynamic relationship between religiosity and sexual activity can differ as a function of gender and ethnicity.

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Table 1

Descriptive Statistics on Religious Importance and Sexual Activity

|	Total sample	Male	Female	White	African-American	Latino	Asian
Religious Importance (wave 1)							
Not important at all	18.1%	16.2%	20.0%	18.9%	15.8%	16.1%	16.2%
Fairly Unimportant	6.5%	5.9%	7.0%	7.9%	1.6%	4.6%	5.2%
Fairly Important	35.7%	34.5%	36.8%	37.6%	24.9%	39.2%	36.7%
Very Important	39.7%	43.4%	36.2%	35.5%	57.8%	40.2%	42.0%
Religious Importance (wave 2)							
Not important at all	19.4%	21.0%	17.9%	21.2%	15.4%	14.9%	16.7%
Fairly Unimportant	6.9%	7.7%	6.1%	8.1%	2.1%	5.6%	7.0%
Fairly Important	35.3%	36.4%	34.1%	36.6%	24.6%	41.9%	31.9%
Very Important	38.4%	34.9%	41.9%	34.1%	57.9%	37.6%	44.4%
Engaged in sex wave 1 (non-virgin)	38.3%	39.7%	36.8%	34.9%	57.8%	36.8%	20.8%
Engaged in sex between wave 1 and 2	37.9%	37.7%	38.6%	35.6%	53.0%	39.9%	18.8%

Note: wave 1 sample size = 20,774; wave 2 sample size = 13,570

Table 2

Parameter Estimates and Confidence Intervals by Gender and Ethnicity

Paths	Females		Males		White		African-American		Asian		Latino	
	B	95% CI	B	95% CI	B	95% CI	B	95% CI	B	95% CI	B	95% CI
Relig w1 to Sex w2 (path a)	-0.04*	-.06 to -.02	-0.02*	-.04 to -.01	-.14*	-.19 to -.08	.01$_a$	-.06 to .09	-0.10	-.21 to .31	-0.14*	-.26 to -.02
Sex w1 to Relig w2 (path b)	-0.19*	-.27 to -.12	-0.09*$_b$	-.17 to .00	-.14*	-.21 to -.08	-0.02	-.15 to 12	0.05	-.40 to .19	-0.25*	-.40 to -.09
Relig w1 to Relig w2 (path c)	.61*	.57 to .66	0.60*	.55 to .65	.65*	.60 to .70	.49*$_a$	.41 to .57	.67*	.49 to .85	.48*$_a$	.39 to .57
Sex w1 to Sex w2 (path d)	.59*	.54 to .63	0.49*$_b$	.45 to .54	1.61*	1.46 to 1.75	1.26*$_a$	1.09 to 1.44	1.25*	.66 to 1.83	1.44*	1.14 to 1.74

Notes: All analyses included measures of age, parental income and parental education as covariates for all endogenous variables. For the gender models, ethnicity was also included as a covariate; for the ethnicity models, gender was also included as a covariate; B signifies unstandardized path coefficients; for paths a and d, logistic coefficients are reported, for paths b and c, regression coefficients are reported; 95% CI = 95% confidence interval for coefficient or exponent of the logistic coefficient; * signifies that path was statistically significant, $p < .05$ level; $_a$ signifies that path is statistically significantly different from White group within ethnicity, $_b$ signifies that path is statistically significantly different from females within gender; w1 = wave, w2 = wave 2.

Figure 1

Model of the Relationship between Religious Importance and Sexual Behavior
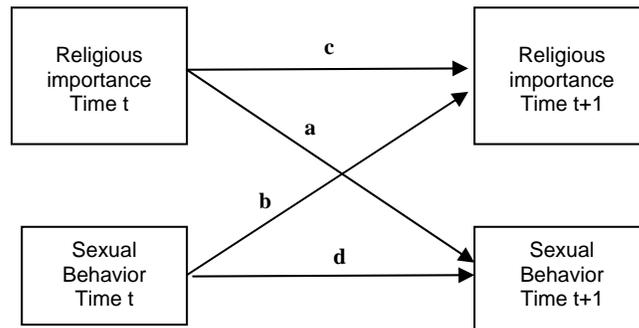
Parental Religiosity and Parenting Styles as Confounding Influences of the

Association between Adolescent Religiosity and Sexual Risk Behavior

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Abstract

The relationship between adolescent religiosity and subsequent sexual risk behavior was examined for a nationally representative sample of adolescents using the National Longitudinal Study of Adolescent Health database in a prospective design. It was found that (1) the association between adolescent religiosity and sexual risk behavior is confounded with parental religiosity in that religious adolescents tend to have religious parents, (2) religious parents engage in different types of parenting styles than less religious parents, and (3) parenting styles were related to multiple facets of risky sexual behaviors. When parental religiosity and parenting behaviors were held constant, the association between religiosity and sexual risk behavior dissipated. The results suggest that traditional views on the protective nature of adolescent religiosity on sexual risk behavior may be overstated.

Parental Religiosity and Parenting Styles as Confounding Influences of the

Association between Adolescent Religiosity and Sexual Risk Behavior

Despite a decline in birth rates for American adolescents from 1990 to 2005, teen

pregnancy rates are again increasing (MMWR, 2009). Among developed countries, the United

States currently has one of the highest teen pregnancy rates (Singh & Darroch, 2000).

Unintended adolescent pregnancies cost the American economy billions of dollars each year

(Jaccard, 2009). There has been a 15% increase in HIV diagnoses among teenagers aged 15-

19 since 2004 (CDC, 2009). Accordingly, social scientists are devoting considerable time and

effort to understanding factors that increase the risk of and protect against adolescent sexual

risk taking.

One explanatory factor that has received increased attention in recent years has been

religiosity. Religion is central to the lives of many Americans (Smith, 2003). Gallup and Bezilla

(1992) report that approximately 90% of adolescents affiliate with some form of religion and

high levels of religious endorsement are not uncommon in adolescence (Smith, Faris, Denton &

Regnerus, 2003). As a general trend, previous research has found that higher levels of

religiosity are associated with lower levels of adolescent sexual activity, leading many to

conclude that embracing religion is protective (e.g., Cotton, Zebracki, Rosenthal, Tsevat, &

Drotar, 2006; Rostosky, Regnerus, & Wright, 2003; Wallace & Forman, 1998; Zaleski &

Schiaffino, 2000; Miller & Gur, 2002; Rotosky, Wilcox, Wright, & Randall 2004; Meier, 2003).

Recently, some scientists have argued that the association between religiosity and sexual

risk behavior is complex and may reflect dynamics other than the protective mechanism

typically ascribed to religiousness. For example, Garcia, Hospital, and Jaccard (2009) found that

when adolescents transition to being sexually active, some withdraw from religious activities and

organizations. This dynamic can produce a negative association between religiosity and sexual

activity, but because sexual activity influences religiosity rather than vice versa (see also Meier,

2003; Hardy & Raffaelli, 2003). To be sure, Garcia et al. (2009) observed evidence for both protective and religiosity adjustment mechanisms, but it is evident from their work that the simple association between religiosity and sexual activity tends to overestimate the protective role of religiosity.

The present research explores another mechanism, independent of reverse causality, which may lead researchers to overestimate the effects of religiosity on sexual risk taking. Several studies have documented an association between parental religiosity and adolescent religiosity, with more religious parents tending to have more religious adolescents. For example, Gunnoe and Moore (2002) found that the frequency of maternal church attendance, the importance the mother placed on religious training and maternal religiosity all were related to the religiosity of the mothers' adolescent children. Potvin and Sloane (1985) found that mothers who attended church frequently were five times more likely to have religious adolescents than mothers who did not attend church frequently. Given this, it is possible that relationships between adolescent religiosity and adolescent sexual behavior are confounded with parental religiosity and the corresponding divergent parenting styles of religious versus non-religious parents. It may be that it is not so much the extent to which adolescents embrace religion that matters in terms of discouraging sexual risk behavior, but rather how their religious versus non-religious mothers parent them. The present research explores this possibility.

The relationship between parental religiosity and adolescent sexual risk taking has been explored in several studies. As examples, Manlove, Terry-Humen, Ikramullan and Moore (2006) found that more frequent religious attendance by parents was related to later initiation of sex by the adolescent, but also lower contraceptive use. Whitbeck, Yoder, Hoyt, and Conger (1999) found that mother's religiosity tended to be negatively associated with later sexual initiation by adolescents. Taken together, these studies suggest links between parental religiosity and adolescent sexual risk behavior and underscore the need to explore the relationships between adolescent religiosity, maternal religiosity, parenting behaviors, and adolescent sexual risk

behavior more fully.

The present study focused on the parenting dimensions of warmth and control, which are the cornerstone of parenting theories in developmental science (e.g., Baumrind, 1966, 1967; 1968 1975; Holmbeck, Paikoff, & Brooks-Gunn, 1995; Newman, Harrison, Dashiff & Davies, 2008). In general, higher levels of warmth and higher levels of control (as long as parents are not over-controlling) are associated with lower levels of adolescent problem behavior (for reviews, see Holmbeck, Paikoff, & Brooks-Gunn, 1995; Newman et al., 2008). Summarizing two decades of research of parental influences on adolescent pregnancy, Miller, Benson, and Galbraith (2001) concluded that parent/child connectedness (i.e., closeness, warmth, support) was related to delaying and reducing adolescent sexual intercourse and that parental monitoring and supervision were related to lower risk of adolescent pregnancy.

Parental religiosity also has been linked to parenting styles. For example, Gunnoe, Hetherington and Reiss (1999) found that maternal religiosity was associated with higher levels of warmth and control after controlling for demographic factors that affect parenting style (e.g., family income, parent education level). Snider, Clements, and Vazsonya (2004) found that adolescents who perceived their parents as religious also tended to perceive them as more strict/supervising and more accepting and more involved. Pearce and Axinn (1998) found that religious mothers tended to report more warmth and closeness in their relationships with their adolescent children than less religious mothers. Manlove, Logan, Moore, and Ikramullah (2008) found that religious parents monitored or were more aware of their adolescents' activities, which were, in turn, associated with delaying the age of first sex.

Taken together, this research suggests that (a) religious mothers tend to have religious sons and daughters, and (b) that religious mothers tend to adopt parenting styles that are more likely to reduce adolescent sexual activity than non-religious mothers. Considered jointly, these mechanisms would inflate the association between adolescent religiosity and adolescent sexual behavior over and beyond an association that is based on simple protection mechanisms. The

present study used a large national sample of adolescents and their mothers in the context of a prospective design to more formally explore the links between adolescent religiosity, maternal religiosity, parenting styles, and adolescent risk behavior.

Method

Respondents

The study used data from the National Longitudinal Study of Adolescent Health (Add Health; Bearman, Jones, & Udry 1997). This is a large scale, nationally representative data base that initially interviewed 20,745 adolescents in grades 7 to 12. The sampling frame was based on a random sample of 80 high schools stratified by region, urbanicity (urban/suburban/rural), school type (public-private-parochial), ethnicity, and size. For each high school, a set of "feeder" schools, which included 7th graders, was identified. Some high schools included grades 7 to 12 and functioned as their own feeder school. A total of 134 discrete schools were studied.

Approximately 200 adolescents were selected from each of the schools, including several strategic over-samples (e.g., Blacks with parents who had a college degree). Sampling weights were derived by Add Health statisticians to permit inferences for a nationally representative sample. A parent, in most cases the resident mother, was asked to complete a questionnaire covering topics that overlapped with the adolescent questionnaire as well as information about the economic status of the household.

Procedure

In-home interviews were conducted with study participants. Adolescents and parents were interviewed separately. Data were recorded on laptop computers. The interviewer read the questions and entered the respondent's answers. For more sensitive sections, the respondent listened to prerecorded questions through earphones and entered the answers directly (audio-CASI). Respondents were reassured of the confidentiality of their responses and could skip any

questions that they felt uncomfortable about answering.

The interview included a wide range of topics including health status, nutrition, peer networks, decision-making processes, family composition and dynamics, risk behavior, educational aspirations and expectations to name a few.

Adolescents were interviewed a second time (Wave 2) approximately 1 year after the first interview. Respondents who were in grade 12 during Wave 1 were not interviewed at Wave 2. Parents were only interviewed during Wave 1. No significant attrition biases were observed across a range of demographic variables, with sampling weights adjusting for attrition and missing data across waves. This study utilizes data from Waves 1 and 2 using only data from 7th through 11th graders.

Measures

Religious Importance. At Wave 1, religious importance was measured with the question, "How important is religion to you?" Responses were scored 1 = "not at all important," 2 = "fairly unimportant," 3 = "fairly important," and 4 = "very important." This question was asked of both the adolescent and the parent. Church attendance is often used as a proxy for religiosity and it was measured as well. Respondents were asked "In the past 12 months, how often did you attend religious services?" Responses were 1 = "never," 2 = "less than once a month," 3 = "less than once a week but at least once a month," 4 = "once a week or more." The correlation between religiosity and attendance was substantial ($r = .68$, $p < .01$). All analyses reported below used the religiosity measure, but they also were replicated using the attendance measure. All conclusions in both sets of analyses were the same. Measures were obtained for both adolescents and mothers.

Sexual Behavior. At Wave 2 (one year after Wave 1), respondents were asked if they had engaged in sexual intercourse since the prior interview. In addition, if the adolescent engaged in sexual intercourse between Waves 1 and 2, a question was asked to determine if they had used

some form of protection at their most recent intercourse. Also at Wave 2, females were asked questions that allowed us to determine if they had experienced a pregnancy between the two waves. The Wave 2 questions allowed us to determine if variables measured at Wave 1 (e.g., adolescent religiosity, parent religiosity) predicted adolescent sexual activity prospectively over the ensuing 12 months.

Parenting Behaviors. Adolescents were asked to rate how warm their mothers are to them using the following questions: "Most of the time, my mother is warm and loving toward me? (Responses were scored from 1 = "strongly disagree," to 5 = "strongly agree"), "How close do you feel to your mother?", "How much do you think she cares about you?" (Responses were scored from 1 = "not at all," to 5 = "very much"). Warmth was defined as the average of the three questions. The alpha coefficient for the items was 0.84.

Adolescents also indicated how controlling/permissive their parents were by responding to the following question: "Do your parents let you make your own decisions about the following:" They were then provided with the following options: The time you must be home on weekend nights; the people you hang around with; what you wear; how much television you watch; which television programs you watch; what time you go to bed on week nights; and what you eat." Each sub-item was rated on a 0 = "Yes," 1 = "No" metric. The mean of the questions multiplied by 100 was the index of control. The higher the score, the more controlling were the parents. The coefficient alpha for the scale was 0.74.

All predictors were measured at baseline; hence this is a prospective design.

Analytic Strategy

Add Health used a stratified cluster sampling design in which schools were sampled from the Quality of Education Database. Student-level sampling weights were calculated by Add Health statisticians (Tourangeau & Shin, 1998). These weights were used to derive parameter estimates and standard errors in the statistical models. The community from which the school

was sampled served as the primary sampling unit (PSU). Strata were defined in accord with the clustered sample design. Analyses used the M Plus software for structural equation modeling (SEM), which allows for sampling weights. The model tested is presented in Figure 1. Because the sexual outcomes were dichotomous, we used a limited information estimation strategy with robust estimators. Logistic regression analysis was performed on the portion of the model that predicted sexual risk behavior from the parenting and religiosity variables. The portion of the model that linked the parenting behaviors to parental religiosity was analyzed using SEM in M Plus. Correlated error was permitted between the parenting variables and adolescent relgiosity. Because these models are just-identified, no global fit indices are reported. Missing data were accommodated for continuous measures using Full Information Maximum Likelihood (Honaker, Joseph, King, Scheve, & Singh, 2003) and in the logistic analyses, using listwise deletion.

We evaluated the model in Figure 1 for the total sample and then again for subgroups defined by gender and by ethnicity. We tested for subgroup differences in structural coefficients using a traditional multi-group SEM strategy that used chi square difference tests with scaling adjustments for robust estimators. For the logistic analysis, coefficient differences were tested using product terms. Only the coefficients for the total sample and for males and females are presented (the coefficients were comparable for the different ethnic groups). Covariates were included for all endogenous variables, including adolescent age, parental income, and parental education. For the analyses on the total sample, gender and ethnicity also were included as covariates. For the gender models, ethnicity was also included as a covariate; for the ethnicity models, gender was also included as a covariate. Virgin status at wave 1 was included as an additional covariate for all sexual outcome equations.

Statements are made below about mediation. We use the logic of the joint significance test as a basis for stating mediation (MacKinnon, Lockwood, Hoffman, West & Sheets, 2002). This is a superior test of mediation relative to the traditional approach of Baron and Kenny (1986). The logic is that if all path coefficients in a mediated chain are statistically significant, then mediation

is declared. The same logic is applied to declarations of statistical significance of total effects.

Results

Table 1 presents descriptive statistics on the major variables included in the models. Tables 2 to 4 present the path coefficient estimates for the three outcomes, (a) Table 2 - whether the adolescent engaged in sexual intercourse in the 12 months after the baseline assessment, (b) Table 3 - for sexually active youth between waves 1 and 2, whether the adolescent used birth control at his or her most recent intercourse, and (c) Table 4 - for females, whether they experienced a pregnancy in the twelve months after baseline.

Focusing on the total sample, it can be seen that parental religiosity was related to adolescent religiosity (path coefficient = 0.58, $p < 0.05$), such that more religious parents tended to have more religious adolescents. Though not reflected in the tables, we found that the effects of parental religiosity on adolescent religiosity were statistically significantly ($p < 0.05$) stronger for Whites and Blacks (path coefficients of 0.61 and 0.61, respectively, both $p < 0.05$) as compared with Latinos (path coefficient = 0.33. $p < 0.05$). Religious parents also tended to parent differently than less religious parents, with both control and warmth increasing as a function of the religiosity of the parent (path coefficients = 0.04 and 1.89, respectively, both $p < 0.05$).

In terms of the sexual outcome variables, for engaging in sexual intercourse in the ensuing 12 months, adolescent religiosity had independent effects on sexual behavior over and above maternal religiosity and the parenting behaviors (logistic coefficient exponent = 0.85, $p < 0.05$), such that higher levels of religiosity were associated with lower levels of sexual activity, holding the parenting variables constant. Parental religiosity was linked to adolescent sexual activity, but it was through its presumed effects on warmth and control, namely (a) religious parents were more likely to be warm and controlling and (b) adolescents of parents who were warm and loving and who exerted more control over their children were less like to engage in sexual intercourse in the ensuing year (see Table 2).

Neither adolescent religiosity nor parental religiosity was significantly related to adolescent use of birth control in the ensuing 12 months (see Table 3). Parental warmth was significantly associated with increased use of birth control (logistic coefficient exponent = 1.28, $p < 0.05$), but parental control was not (logistic coefficient exponent = 1.0, ns).

For the occurrence of a pregnancy in the ensuing 12 months (Table 4), adolescents of parents who were controlling were less likely to experience a pregnancy. Parental religiosity was associated with the likelihood of an adolescent experiencing a pregnancy, but these effects were mediated by the effects of parental religiosity on parental control (using the logic of the joint significance test).

In sum, adolescent religiosity was not protective for the use of birth control and although it was associated with a lower probability of adolescent pregnancy in the ensuing 12 months, this link became statistically non-significant when parental religiosity and differential parenting styles were held constant. For adolescent sexual activity in the ensuing 12 months, the data were consistent with adolescent religiosity having a protective effect, independent of parental religiosity and parenting styles.

For our subgroup analyses, the magnitude of the coefficients for males and females tended to mirror those of the total sample, and this also was true for the different ethnicities. At times, there were differences in statistical significance, but this seemed to be more due to the smaller sample sizes for the subgroups rather than a non-trivial change in the magnitude of the structural coefficients.

Baumrind's theory of parenting suggests there may be a curvilinear effect of control on sexual risk taking: Parents who exert too much control over their adolescent children will experience a form of rebellion on the part of their adolescents. We tested for such effects using polynomial terms for control in the logistic analyses and generally found non-significant coefficients for the squared control term. The one exception was the prediction of the occurrence of a pregnancy for White females (logistic coefficient for the control variable (divided

by 10) was -0.131 and for the squared control variable (divided by 10 before squaring), it was

-0.104, $p < 0.05$), but this was not the case for any of the other groups.

Discussion

The negative association between religiosity and adolescent sexual activity is well

documented and has led many social scientists to conclude that religiosity is protective for

adolescent sexual risk taking. Research has recently been conducted to suggest that the bases

of this negative association are complex, with some studies indicating that adolescent

distancing of oneself from religion after they engage in sex may comprise part of the association

(Garcia et al. 2009). The present research offers additional perspectives on the association

between religiosity and adolescent sexual risk behavior.

Most empirical research relating religiosity to adolescent sexual behavior has been cross-

sectional in character, has focused on whether adolescents have transitioned to sexual activity,

and has used convenience samples. The present research, by contrast, used a nationally

representative sample in a prospective design that predicted different facets of sexual activity.

Three key findings from the present research have implications for the relationship between

adolescent religiosity and sexual risk taking. First, consistent with past research, we found that

adolescent religiosity is confounded with parental religiosity, i.e., there is a sizeable relationship

between maternal religiosity and adolescent religiosity. Second, we found that there is a

relationship between the religiosity of mothers and the kinds of parenting styles they adopt, at

least with respect to the fundamental parenting dimensions of warmth/affection and control.

More specifically, we found that religious parents tended to be perceived by their adolescents as

more warm and affectionate and more controlling than less religious parents. Finally, we found

that parenting styles were related to all three sexual outcomes. Parents who were seen by their

adolescents as more controlling were less likely to have adolescents who engaged in sexual

intercourse in the ensuing year and, for female adolescents, less likely to experience a

pregnancy in the ensuing year. Similarly, parents who were seen by their adolescents as being

more warm and loving were less likely to have adolescents who engaged in sexual intercourse in the ensuing year, and were more likely to have adolescents who used birth control in the ensuing year.

Given the above results, it is reasonable to argue that some portion of the association between adolescent religiosity and sexual risk behavior is spurious due to the fact that religious parents (a) have religious children and (b) parent in ways that promote lower levels of sexual risk behavior. In the present study, when parental religiosity and parenting style were statistically held constant, adolescent religiosity was not significantly related to either the use of birth control in the ensuing year or, in the case of adolescent females, experiencing a pregnancy in the ensuing year. However, for the behavior of engaging in sexual intercourse in the ensuing year, adolescent religiosity was predictive in a protective direction, independent of parental religiosity and parenting style.

These results suggest that the effects of adolescent religiosity on sexual risk taking may depend on the facet of sexual risk taking in question. Religiosity does not seem to be protective for the use of birth control nor for the kinds of activities that adolescents need to pursue to avoid a pregnancy. However, the data are consistent with the proposition that adolescent religiosity discourages sexual activity per se, even after controlling for a range of confounds.

Faith-based outreach has received increased attention of late (Boorstein & Kindy, 2009; Meckler, 2005). As religious organizations outreach to adolescents, they are likely to reach adolescents who are more religious than other adolescents. Our results suggest that although religious youth may engage in lower levels of sexual risk behavior, some of the reasons for this derive from factors that have little to do with religion. As such, religious organizations may need to structure their programs beyond appeals to religious motivations and address factors that are more typical of non-religion based interventions. Our results also underscore the importance of faith-based (and non faith-based) programs to reach out to parents of adolescents and educate them about parenting styles that can reduce the risk of adolescent problem behaviors.

The results of this study, of course, must be interpreted within the context of the methodological limitations of the design. The outcome measures were based on a self report, which can be biased. The measures of parenting styles were based on reports of adolescents, which may be biased. Measurement and specification error can bias parameter estimates. The data were correlational and do not permit causal inference. Despite these limitations, the results are interesting and suggest that associations between religiosity and sexual risk activity should not be entirely ascribed to a presumed causal influence of religiosity on sexual activity and that whatever protective effects adolescent religiosity has, may differ depending on the facet of the sexual risk behavior of interest.

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Table 1

Descriptive Statistics

Variable	Estimate
Adolescent Religiosity	2.98
Parental Religiosity	3.58
Parental behaviors	
Warmth	4.61
Control	28.75
Sexual Risk behaviors	
Sex between wave 1 & wave 2	38%
Used Birth Control (wave 2)	71%
Ever had Sex (wave 1)	33%
Got Pregnant (wave 2)	4%
Age (years)	15.1
Race (%)	5.9%
White (non-Hispanic)	68%
Black (non-Hispanic)	15.5%
Asian	4.0%
Hispanic	12.1%
Gender (% female)	49.7%
Median Parental Income (annual)	$26,000
Parental Education (%)	
Never attended school	0.2%
Less than 8th	4.5%
Did not graduate high school	10.7%
High school degree	30.0%
Trade school	17.2%
College but no degree	18.3%
College degree	12.0%
Professional beyond college	7.2%

Notes: All values are means, unless indicated as percent:
Sample size is 12,815.

Table 2

Prediction of Sexual Activity in Ensuing 12 Months

Paths	Total		Female		Male	
	B	95% CI	B	95% CI	B	95% CI
Parental Religiosity to Adolescent Religiosity (path a)	.58*	.51 to .65	.63*	.53 to .72	.54*	.45 to .63
Adolescent Religiosity to Intercourse wave 2 (path b)	.85*	.79 to .92	.78*	.70 to .87	.91	.92 to 1.01
Parental Religiosity to Intercourse wave 2 (path c)	.90	.80 to 1.02	.90	.76 to 1.07	.92	.78 to 1.09
Parental Religiosity to Parental Warmth (path d)	.04*	.01 to .08	.06*	.01 to .11	.02	-.02 to .07
Parental Religiosity to Parental Control (path e)	1.89*	.76 to 3.02	1.60*	.01 to 3.2	2.19*	.72 to 3.67
Parental Warmth to Intercourse wave 2 (path f)	.85*	.75 to .97	.92	.79 to 1.08	.78*	.62 to .98
Parental Control to Intercourse wave 2 (path g)	.99*	.991 to .996	1.00	.99 to 1.002	.99*	.988 to .991

Notes: B signifies unstandardized path coefficients; for paths a and d, logistic coefficient exponents are reported, for paths b and c, regression coefficients are reported; * signifies that path was statistically significant, $p < .05$ level; 95% CI = 95% confidence interval for coefficient or exponent of the logistic coefficient; Sample size are 12,815 for the total sample, 6,161 for males and 6,654 for females.

Table 3

Prediction of Use of Birth Control at Most Recent Intercourse in Ensuing 12 Months

Paths	Total		Female		Male	
	B	95% CI	B	95% CI	B	95% CI
Parental Religiosity to Adolescent Religiosity (path a)	.58*	.51 to .65	.63*	.53 to .72	.54*	.45 to .63
Adolescent Religiosity to Birth Control wave 2 (path b)	.99	.89 to 1.10	1.06	.92 to 1.23	.93	.80 to 1.07
Parental Religiosity to Birth Control wave 2 (path c)	.99	.85 to 1.16	.97	.75 to 1.26	1.03	.83 to 1.29
Parental Religiosity to Parental Warmth (path d)	.04*	.01 to .08	.06*	.01 to .11	.02	-.02 to .07
Parental Religiosity to Parental Control (path e)	1.89*	.76 to 3.02	1.60*	.01 to 3.2	2.19*	.72 to 3.67
Parental Warmth to Birth Control wave 2 (path f)	1.28*	1.09 to 1.51	1.21	.99 to 1.48	1.39*	1.07 to 1.81
Parental Control to Birth Control wave 2 (path g)	1.0	.99 to 1.001	.99	.985 to 1.00	1.00	.99 to 1.01

Notes: B signifies unstandardized path coefficients; for paths a and d, logistic coefficient exponents are reported, for paths b and c, regression coefficients are reported; * signifies that path was statistically significant, $p < .05$ level; 95% CI = 95% confidence interval for coefficient or exponent of the logistic coefficient; Sample sizes are 4,885 for the total sample, 2,266 for males and 2,539 for females.

Table 4

Prediction of Occurrence of a Pregnancy in Ensuing 12 Months – Females Only

Paths	B	95% CI
Parental Religiosity to Adolescent Religiosity (path a)	.63*	.53 to .72
Adolescent Religiosity to Pregnancy wave 2 (path b)	.92	.75 to 1.12
Parental Religiosity to Pregnancy wave 2 (path c)	.90	.65 to 1.25
Parental Religiosity to Parental Warmth (path d)	.06*	.01 to .11
Parental Religiosity to Parental Control (path e)	1.60*	.01 to 3.20
Parental Warmth to Pregnancy wave 2 (path f)	.82	.61 to 1.11
Parental Control to Pregnancy wave 2 (path g)	.99*	.98 to .996

Notes: B signifies unstandardized path coefficients; for paths a and d, logistic coefficient exponents are reported, for paths b and c, regression coefficients are reported; * signifies that path was statistically significant, $p < .05$ level; 95% CI = 95% confidence interval for coefficient or exponent of the logistic coefficient; Sample size = 6.732.

Figure 1

Path Diagram of Variable Relationships
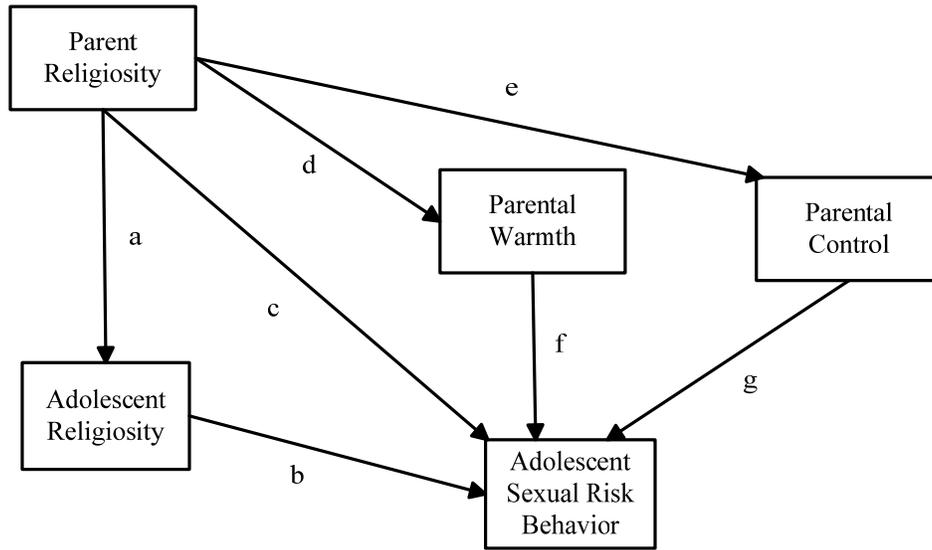
Adolescent Religiosity and Future Sexual Risk Behavior:

Are Protective Effects Spurious?

Michelle Hospital, James Jaccard and Tracey Garcia

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Abstract

Religiosity has received much attention as a factor in reducing adolescent sexual risk behavior. However, researchers have found numerous confounds with adolescent religiosity that can render the association between religiosity and sexual behavior spurious. Previous studies have been mostly cross-sectional, used convenience samples, and have been inconsistent in controlling for confounds. The present study examined religious importance and religious service attendance as predictors of sexual activity for a nationally representative sample of adolescents using a prospective design while controlling for possible confounds. Mixed evidence for the protective effects of religiosity was observed.

Adolescent Religiosity and Future Sexual Risk Behavior:

Are Protective Effects Spurious?

Adolescent unintended pregnancies in the United States remain unacceptably high. On average, more than 1,500 female adolescents become pregnant every day (MMWR, 2000). The economic, social, and emotional costs of adolescent pregnancy are well documented and considerable. As a result, social scientists have sought to identify factors that impact adolescent sexual risk taking.

One set of variables that has received considerable attention is religiosity and church attendance. Research typically observes a negative association between these constructs and adolescent sexual activity, leading many scientists to conclude that religion is protective (e.g. Cotton et al., 2006; Rostosky, Regnerus, Comer, 2003; Zaleski & Schiaffino, 2000). However, most of this research has used cross-sectional designs with convenience samples and has not reported results in ways that one can appreciate the magnitude of the association. Some social scientists argue that the association between religiosity and adolescent sexual risk taking is complex and reflects dynamics other than protective mechanisms. For example, Garcia, Hospital, and Jaccard (2009) found that when adolescents transition to being sexually active, some withdraw from religion and religious activities. This dynamic produces a negative association between religiosity and sexual activity, but because sexual activity influences religiosity rather than vice versa.

There are numerous confounds with adolescent religiosity that can render the association between religiosity and sexual behavior spurious. For example, Hospital, Jaccard & Garcia (2009) found (a) that religious parents tend to have religious adolescent children and (b) that religious parents are more likely to adopt parenting styles that are protective, hence (c) the association between adolescent religiosity and sexual risk behavior reflects, in part, the spurious effects of parenting styles of religious parents. Other confounds that have some empirical base include the age of the adolescent, social class, ethnicity, and family structure. Studies have

been inconsistent in controlling for these confounds. Estimates of the protective effect of religiosity are clouded, accordingly.

The present study estimates the association between religiosity and sexual risk behavior adjusting for the above difficulties. A large, nationally representative sample of adolescents is analyzed using a prospective design predicting sexual behavior over the ensuing 12 months as well as six years later, during young adulthood. The analysis has applied implications because many faith-based programs aimed at reducing adolescent sexual risk behavior appeal to religious constructs to motivate adolescents to avoid sexual risks. These programs may need to be augmented with more traditional appeals to the extent that religious orientations have weak effects on behavior.

Method

Respondents

Data were analyzed from the National Longitudinal Study of Adolescent Health (Add Health; Bearman, Jones, & Udry 1997). For methodological details and descriptions of all measures used in this study, see www.cpc.unc.edu/addhealth. The first wave of the study included interviews with a nationally representative, school-based sample of 20,745 adolescents in grades 7 to 12, and their mothers. These youth were re-interviewed one year later and again six years later (N=15,170).

Measures

At Wave 1, religiosity was measured with the question, "How important is religion to you?" Responses were scored on a 4 point metric (see Table 1). Church attendance was measured by asking "In the past 12 months, how often did you attend religious services?" Responses were measured on a 4 point metric (see Table 1).

For sexual behavior, at Wave 2, questions determined if adolescents engaged in sexual intercourse since the prior interview and, if so, whether birth control was used at the most recent intercourse. Also measured was whether (female) adolescents became pregnant between

Wave 1 and 2. At Wave 3 (young adulthood), questions determined the frequency of intercourse in the past 12 months, consistency of condom use across instances of intercourse in the past 12 months ("none," "sometimes," "half the time," "most of the time," and "all of the time"), and the number of sexual partners youth had in the past year. Additionally, respondents provided a urine sample, which was tested for three sexually transmitted diseases; chlamydia, gonorrhea and trichomoniasis.

Analytic Strategy

Robust regression or logistic analysis was conducted using sampling weights from Add Health. Analyses were on unmarried youth. The covariates included adolescent age, gender, ethnicity, maternal education, family income, number of parents residing in the household, family size, maternal employment status, virgin status at baseline, maternal religiosity, maternal parenting styles of control and warmth (see Hospital et al., 2009), adolescent religious denomination, verbal ability, and pubertal status. Care was taken not to include covariates that could be interpreted as mediators of the religiosity-sexual behavior association. Religiosity and church attendance were represented as dummy variables.

Results

Table 1 presents, at each level of the religiosity and religious attendance measures, either the estimated proportion of youth performing the (dichotomous) behavior or the predicted mean value of each sexual outcome variable, holding the confounds constant at their mean values.

Discussion

With aggressive controls for confounds and using a prospective design with a nationally representative sample, adolescent religiosity and attendance at religious services were either not significantly related to or were associated with *higher* levels of risk behavior for the use of birth control at one's most recent intercourse, condom use consistency, the occurrence of a pregnancy during adolescence, and testing positive for an STD in young adulthood. These religious variables were, however, associated with lower levels of sexual activity and the

number of sexual partners, but only for the most religious adolescents and for those who were the most ardent attendees of religious services. Some of these statistically significant effects were weak, while others seemed more substantial. The results suggest that the protective effects of religiosity in the sexual risk domain should be viewed as mixed and that faith based outreach may need to augment appeals to religious constructs with additional foci on constructs covered in extant evidence-based interventions.

The results of the study must be interpreted within the constraints of the study design. Measurement error can bias parameter estimates, as can specification error. With the exception of the STDs, the indices of sexual risk behavior were based on self-reports. The measures of religiosity were crude relative to extant richer conceptualizations of religiosity. Despite these limitations, the results suggest we need more research on blending faith based outreach efforts with evidence-based strategies for reducing sexual risk behavior.

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Table 1

Sexual Risk Behaviors as a Function of Religiosity and Attendance at Religious Services

Religiosity Score	Sex from W1 to W2[b]	BC from W1 to W2[b]	Became Pregnant W1 to W2[b]	Condom Use W3[c]	Freq of Sex W3[c]	Number of Partners W3[c]	STD W3[b]
Religiosity							
Very important	.33	.71$_a$	.04 $_a$	2.99$_a$	10.41	4.13	.06$_a$
Fairly important	.37$_a$	.75$_a$	.04 $_a$	3.22$_a$	12.10$_a$	4.49$_a$	.08$_a$
Fairly unimportant	.38$_a$	.76$_a$	.03 $_a$	2.96$_a$	13.01$_a$	4.88$_a$	.08$_a$
Not important at all	.42$_a$	.67$_a$	.01	3.55$_a$	12.49$_a$	5.33$_a$	.05$_a$
Religious Service Attendance							
Once a week or more	.34	.69$_a$	.03$_a$	3.29$_a$	10.39	4.10	.06$_{a,b}$
At least once a month	.38$_a$	.75$_a$	.05$_b$	3.10$_a$	12.34$_a$	4.56$_a$	.07$_{a,b}$
Less than once a month	.38$_a$	.76$_b$	.03$_{a,b}$	3.05$_a$	12.71$_a$	4.89$_a$	.08$_a$
Never	.38$_a$	.71$_{a,b}$	.03$_{a,b}$	3.22$_a$	11.84$_a$	4.76$_a$	.04$_b$

Notes: [b] signifies values for this variable are proportions; [c] signifies values for this variable are means; within a column and within an outcome variable (religiosity or religious service attendance), proportions or means that share a common $_a$ subscript were not statistically significantly different, $p > 0.05$; for a complete list of covariates included in the analyses see Methods' section.

Denominational Differences in Sexual Risk Taking: Are Catholics, Jews, Mormons, and

Protestants More or Less Prone to Engage in Sexual Risk Behavior

than Adolescents Who Eschew Religious Affiliation?

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Abstract

The relationship between affiliation with a religious denomination and sexual risk behavior was examined for a nationally representative sample of adolescents in a prospective design. Large denominational variations in adolescent sexual risk behavior were observed. When compared against adolescents who reported having no religious affiliation, youth in numerous denominations did not differ significantly on multiple risky sexual behaviors. Within certain denominations, data consistent with protective influences of religious affiliation held primarily for those who endorsed the highest levels of religiosity. The results underscore the importance of denominational differences. Implications for faith-based outreach are discussed.

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Despite recent declines, adolescent unintended pregnancies in the United States remain

unacceptably high. On average, more than 1,500 female adolescents in the United States

become pregnant every day (MMWR, 2000). The economic, social, and emotional costs of

adolescent pregnancy are well documented and considerable. Sexually transmitted diseases

(STDs) also are widespread among adolescents. For teenagers, about five percent of young

men and five to ten percent of young women are infected with Chlamydia. By the time they

reach adulthood, between 15 and 20 percent of American youth will have become infected with

herpes and 25 to 45 percent of young women will be infected with human papillomavirus (CDC,

2000). As a result of such trends, social scientists have sought to identify factors that impact

adolescent sexual risk taking.

One class of variables that has received considerable attention is that of religion. It is well

known that religion is an important factor in the lives of adolescents (Smith, 2003). Gallup and

Bezilla (1992) report that approximately 90% of adolescents affiliate with some form of religion.

Despite this, religion as an influence on adolescent sexual risk taking has been studied primarily

in general terms, focusing mainly on the constructs of church attendance and self reports of

religiosity. Although this research has yielded some inconsistent findings (e.g., Donnelly,

Duncan, Goldfarb, & Eadie 1999), the overall trend in results are consistent with the proposition

that religious variables are protective for adolescent sexual risk behaviors (e.g. Cotton,

Zebracki, Rosenthal, Tsevat, & Drotar, 2006; Rostosky, Regnerus, Comer, 2003; Wallace &

Forman, 1998; Zaleski & Schiaffino, 2000).

Religious Denomination

Religion is a multifaceted construct and one facet that has been understudied is that of

religious denomination. Denominational differences have their historical roots in the American

experience of religious pluralism. Steensland (2003) notes that denominations generate their own world views through symbols, pedagogy and rituals. Religious denominations have different teachings on matters related to sexual behavior, so it is reasonable to expect differences in adolescent sexual activity as a function of religious denomination. Despite this, there are only a handful of studies that consider the association between religious denomination and adolescent risk behavior in general and sexual risk taking in particular (e.g., Ford, 2006).

The present study addresses this gap by exploring denominational differences in adolescent sexual behavior using a large, nationally representative sample of adolescents in the United States. We document adolescent sexual activity in 22 religious denominations. Given the complexity of religious doctrine within each denomination, it is difficult to make *a priori* predictions about denominational differences in adolescent sexual activity that might occur. Since the extant literature suggests that religion is protective, however, a reasonable working hypothesis is that adolescents who formally identify with any given denomination should show reduced sexual activity relative to those who do not affiliate with any religious denomination. Indeed, it is not unreasonable to use the comparison of rates of sexual behavior of a given religious denomination with adolescents who choose not to identify with any religion as a standard for defining if affiliation with that denomination is protective. Stated more formally, if the sexual activity of those who identify with a given denomination is significantly lower than those who eschew identifying with any denomination, then affiliation with that denomination can be said to be "protective." If there are no meaningful differences between the two groups in sexual risk behavior, then the affiliation can be said to be not protective.

Of course, differences in sexual behavior among the different denominations and those who do not affiliate with a religion may have little to do with religion but instead may reflect selection effects. For example, it is well known that African American adolescents tend to engage in higher levels of sexual activity than European American adolescents. African American adolescents also are far more likely to be Baptist than they are to be Mormons, so

denominational differences in sexual activity between these groups might simply reflect differences in the ethnic composition of the denominations. The present research examines denomination differences both before and after controlling for demographic confounds, including such confounds as ethnicity, gender, education, and income.

Religious Denomination and Religiosity

Within a given religious denomination, adolescents differ in how religious they are. Even if affiliation with a denomination does not prove to be protective using the above standard, perhaps those members of a denomination who are more religious, and who thereby embrace that religion more, will be less likely to engage in sexual risk behavior as compared with those who do not associate with a religion. Of interest, then, is whether the difference in sexual base rates between adolescent members of a denomination and adolescents who affiliate with no religion varies as a function of how religious members within that denomination are. For example, are Catholic adolescents who are very religious less likely to engage in sexual activity than adolescents who say they do not have a religion? Is this also true for Catholic adolescents who are only moderately religious, or for Catholic adolescents who are only slightly religious? The present research also explores the extent to which different levels of religiosity within a denomination are protective relative to a comparison standard of the sexual activity of adolescents who affiliate with no religious group.

Generalizability of Denominational Effects

Studies suggest that associations between religion and risk behavior may vary as a function of gender and ethnicity. For example, Rostosky, Wilcox, Wright and Randall (2004) reviewed studies relating religiosity to adolescent sexual risk behavior and found that the majority of studies showed an association between religiosity and the age of sexual initiation for females, but findings were inconclusive for males. Studies also have found that the effects of religious attitudes and practices on adolescent sexual activity vary among racial and ethnic

groups (Brega & Coleman, 1999; Hendricks, Robinson-Brown, & Gary, 1984; Murry, 1996). In one study of adolescent males, for example, religious service attendance was associated with delayed sexual initiation in some ethnic groups, but not African American youth (Ku, Sonenstein, & Pleck, 1993). Given the above, the present study also tested for the robustness of denominational differences in sexual activity across gender and ethnicity.

Denominational Effects Six Years Later: Adolescent Religion and Adult Sexual Behavior

Most studies of religious variables use cross-sectional designs, which preclude explorations of long term correlates of adolescent religious affiliation. It is possible that religion is protective during adolescence, but that religion's impact does not persist throughout the years, thereby dissipating by young adulthood. Research suggests that early adolescent sexual activity, such as age at first intercourse, is one of the best predictors of future unintended pregnancies and the occurrence of sexually transmitted diseases (STDs), primarily because early sexual debut tends to increase the time of exposure to risk (Rostosky, Regnerus, & Wright, 2003). To the extent that religion delays the onset of sexual activity during adolescence, one would expect to see results of these effects later in life, during young adulthood, since the time of risk exposure is lessened. This raises the question of whether the effects of religious orientations during adolescence on outcomes such as the occurrence of STDs during young adulthood are primarily due to religion's protective effects on sexual behavior during adolescence, or whether adolescent religious orientations have independent effects on adult sexual behavior over and above their effects on delaying sexual activity during adolescence. For example, affiliation with a religion during adolescence may instill fundamental values and morals in a person that are carried into adulthood and that impact behavior at that time. If the primary mechanism by which religion influences negative sexual outcomes in young adulthood is decreased exposure due to its delay of adolescent sexual activity, then one would not expect to observe independent effects of adolescent religion on adverse sexual outcomes in adulthood. Another purpose of the present study was to examine denominational affiliation during

adolescence and its association with sexual behavior six years later, over and above any association it has with sexual behavior during adolescence.

In sum, the present study uses a large, nationally representative sample of adolescents and a prospective design (1) to test if there are denominational differences in adolescent sexual risk taking relative to adolescents who do not affiliate with a denomination, (2) to test if these differences vary by gender and ethnicity, (3) to evaluate if sexual risk activity of youth within a denomination differs from youth who do not affiliate with a denomination as a function of religiosity within that denomination, and (4) to test if denominational differences translate into differences in sexual risk behavior during young adulthood over and above any differences observed during adolescence.

<div align="center">Method</div>

Respondents

The study used data from the National Longitudinal Study of Adolescent Health (Add Health; Bearman, Jones, & Udry 1997). This is a large scale, nationally representative data base that initially interviewed 20,745 adolescents in grades 7 to 12. The sampling frame was based on a random sample of 80 high schools stratified by region, urbanicity (urban/suburban/rural), school type (public/private/parochial), ethnic mix, and size. For each high school, a set of "feeder" schools, which included 7th graders, was identified. Some high schools included grades 7 to 12 and functioned as their own feeder school. A total of 134 discrete schools were studied.

Approximately 200 adolescents were selected from each of the schools, including several strategic over-samples (e.g., Blacks with parents who had a college degree). Sampling weights were derived by Add Health statisticians to permit inferences for a nationally representative sample. A parent, in most cases the resident mother, was asked to complete a questionnaire covering topics that overlapped with the adolescent questionnaire as well as information about the economic status of the household.

Procedure

In-home interviews were conducted with students and their mothers. Data were recorded on laptop computers. The interviewer read the questions and entered the respondent's answers. For more sensitive sections, the respondent listened to prerecorded questions through earphones and entered the answers directly (audio-CASI). Respondents were reassured of the confidentiality of there responses and could skip any questions that they felt uncomfortable about answering. Adolescents and parents were interviewed separately.

The interview included a wide range of topics including health status, health facility utilization, nutrition, peer networks, decision-making processes, family composition and dynamics, educational aspirations and expectations, to name a few.

Adolescents were interviewed a second time (Wave 2) approximately 1 year after the first interview. Respondents who were in grade 12 during Wave 1 were not interviewed at Wave 2. Parents were only interviewed during Wave 1. All adolescents included in the Wave 1 sample were recruited for in-home interviews at Wave 3, which occurred approximately 6 years after the first interview. 15,670 respondents were interviewed at Wave 3, representing a re-interview rate of about 80%. No significant attrition biases were observed across a range of demographic variables, with sampling weights adjusting for attrition and missing data across waves.

Measures

Denomination. At Wave 1, the adolescent was asked to identify what religious denomination he or she was affiliated with by asking, "What is your present religion?" Respondents were given the choice of 0 = "none", 1 = "Protestant", 2 = "Catholic", 3 = "Jewish", 4 = "Buddhist", 5 = "Hindu", 6 = "Muslim" and 7 = "other". Respondents who selected "Protestant" were then asked, "What is your denomination?" and were provided an extended range of alternatives A general religious denomination variable was created by combining responses from these two questions, yielding 22 religious denominations (see Table 1).

Religiosity. At Wave 1, religiosity was measured with the question, "How important is religion to you?" Responses were scored 1 = "not at all important," 2 = "fairly unimportant," 3 = "fairly important," and 4 = "very important." Church attendance is often used as a proxy for religiosity and it was measured as well. Respondents were asked "In the past 12 months, how often did you attend religious services?" Responses were 1 = "never," 2 = "less than once a month," 3 = "less than once a week but at least once a month," 4 = "once a week or more." The correlation between religiosity and attendance was substantial ($r = .68$, $p < .01$). All analyses reported below used the religiosity measure, but they also were replicated using the attendance measure. All conclusions in both sets of analyses were the same.

Sexual Behavior. At Wave 1, respondents were asked whether they had ever engaged in sexual intercourse. Female respondents only were asked whether they had ever been pregnant. Self reported age of sexual initiation was analyzed as reported at Wave 3 to eliminate issues of right censoring. At Wave 2 (one year after Wave 1), respondents were asked if they had engaged in sexual intercourse since the prior interview and questions were asked to determine if the (female) adolescence became pregnant between Wave 1 and Wave 2. In addition, if the adolescent engaged in sexual intercourse between Waves 1 and 2, a question was asked to determine if they had used some form of protection at their most recent intercourse. The Wave 2 questions allowed us to determine if religious affiliations at Wave 1 predicting adolescent sexual activity prospectively over the ensuing 12 months.

At Wave 3 (young adulthood), frequency of sex was measured by asking respondents, "How many times have you had vaginal intercourse in the past 12 months?" Use of condoms was measured by asking respondents to estimate how often he/she used condoms during the last 12 months when engaging in vaginal intercourse. Response options were "none," "sometimes," "half the time," "most of the time," and "all of the time." Respondents also were asked "With how many partners have you ever had vaginal intercourse, even if only once?" Additionally, respondents were asked to provide a urine sample, which was then tested for one

of three sexually transmitted diseases (STD) -- chlamydia, gonorrhea and trichomoniasis. 91%

of Wave 3 respondents who were asked provided samples and there were no significant biases

in refusals.

Analytic Strategy

Analyses used logistic and multiple regression–based methods with robust estimators as

implemented in the M Plus and SPSS (complex samples) computer programs. Add Health

employed a stratified cluster sampling design. Student-level sampling weights were developed

by the Add Health statisticians (Tourangeau & Shin, 1998). The community from which the

school was sampled was the primary sampling unit (PSU). Strata were defined in accord with

the clustered sample design. Analyses were conducted both with and without weights. The

results reported here are from the weighted analyses. Discrepancies between the weighted and

unweighted analyses are noted.

Results

Denominational Differences

We examined 22 denominations on ten sexual risk behaviors and formally compared each

denomination with those respondents who reported not having any religious affiliation (see

Table 1). The behaviors demarcated in Table 1 as being measured at Wave 1 are

contemporaneous with the assessment of denomination, while all other behaviors are

prospective. Wave 2 outcomes represent behavior over the ensuing year and Wave 3 outcomes

represent behavior six years later. The denominations are ordered in Table 1 in ascending order

of their base rate of adolescents having engaged in sexual intercourse as measured at Wave 1

(column 1 of Table 1).

There are several notable trends in the Table. First, 49% of adolescents who eschewed

any religious affiliation had engaged in sexual intercourse. Some religious denominations had

base rates that did not differ significantly from this standard (e.g., Pentecostals, Baptists,

Muslims, and Adventists), while other denominations did (e.g., Latter Day Saints, Jewish).

There is considerable variability in the base rates of having engaged in sexual intercourse as a

function of denomination, ranging from a low of 15% for Buddhists, 20% for Latter Day Saints

(Mormons), and 22% for Jews, to a high of 50% for AME Zion, 54% for Holiness, and 59% for

Christian Scientists. Among the largest denominations, the rate of sexual activity is highest for

Baptists (45%) and lowest for Methodists (32%) and Catholics (32%), followed by Disciples of

Christ (35%).

Across most of the sexual risk outcomes in Table 1, Jews and Mormons tended to engage

in lower levels of risk behavior than the other denominations, though there were some

exceptions for some behaviors. Also noteworthy were the findings that Baptists and AME Zions

were *more* likely than adolescents who eschewed a religious denomination to test positive for

an STD in young adulthood.

Because of the large number of denominations, we focused our subsequent more detailed

analyses on only six of them (boldfaced in Table 1). The six denominations were selected

because they were either the largest in number of cases or because they had elevated or

lowered levels of risk behavior coupled with a sufficient sample size to permit meaningful

additional analysis. To make the task manageable, we also targeted only a subset of the

outcome variables for consideration.

Does Religiosity within a Denomination Matter?

We tested if adolescents who embraced religion more strongly (i.e., had higher levels of

reported religiosity), were more likely to avoid sexual risk behavior than adolescents who were

less religious. The results of these analyses differed depending on the type of sexual risk

behavior. For example, logistic regression analyses that included religiosity and denomination

as predictors revealed that within-denominations, religiosity during adolescence was not

significantly related to the occurrence of an STD during young adulthood (Odds Ratio for

religiosity = 1.06, ns). Thus, more religious adolescents were as likely to contract an STD six

years later in young adulthood, as were less religious adolescents, no matter which denomination they were in. However, within denominations, adolescent religiosity was statistically significantly related in a protective direction to (a) whether the adolescent engaged in sexual intercourse in the ensuing year (exponent for religiosity coefficient in a logistic analysis = 0.69, $p < 0.05$),(b) whether a female adolescent experienced a pregnancy in the ensuing year (exponent for religiosity coefficient in a logistic analysis = 0.75, $p < 0.05$), and (c) for the age at first intercourse (unstandardized regression coefficient for religiosity was 0.34, $p < 0.05$).

To determine if the effect of religiosity on these three adolescent outcomes varied by denomination, we conducted interaction analyses with product terms. No statistically significant interaction effects were observed.

We used the derived regression equations to calculate predicted outcome means/percentages at each level of religiosity within denominations for selected outcome variables, and these are presented in Table 2. Also in Table 2 are the outcome means/percentages for adolescents who reported not having a religious affiliation (i.e., "No Religion" group). Underlined for each outcome and denomination is the entry that corresponds to the religiosity level where the predicted outcome first becomes "less risky" than that of the "No Religion" group. For example, for Baptists, only adolescents who say religion is "very important" have engaged in less sex than the "No Religion" group. For Methodists, individuals who state religion is "fairly unimportant" or higher are less likely to engage in sex than the "No Religion" group.

As seen in Table 2, those who endorsed the highest level of religiosity (i.e., who said religion was "very important" to them) were at a lower risk for having engaged in sexual intercourse in the ensuing year, for experiencing a pregnancy in the ensuing year, and for delaying the age of sexual initiation as compared to the "No Religion" group. Episcopalians and Mormons who endorsed even the lowest level of religiosity were at a lower risk for engaging in these behaviors relative to the "No Religion" group. However, for Baptists and Disciples of

Christ, the protective aspects of religious affiliation seem to apply only for those adolescents who endorsed higher levels of religiosity (i.e., who indicated religion was "fairly important" or "very important" in their lives). Religiosity was inversely related to the use of birth control at one's most recent intercourse and this is reflected in Table 2.

Demographic Confounds with Denomination

Different denominations are comprised of demographically distinct groups, so it is possible that the denominational differences in Tables 1 and 2 can be attributed to demographic confounds rather than religious experiences associated with participation in a given denomination. Table 3 presents selected demographic confounds we observed between different denominations. For example, Baptists are considerably more likely to have African Americans as members than are the other denominations shown in Table 3. Episcopalians, Mormons and Methodists are predominantly European American. Annual income is notably higher for Episcopalians and Mormons. In addition, Episcopal, Mormon and Methodist parents reported significantly higher levels of education.

We repeated the analyses of denominational differences in sexual behavior reported in Table 1 for the six target denominations, but using gender, income, education, ethnicity, and age of the adolescent as covariates in the models. Table 4 reports the predicted outcome means/percentages when the covariates were held constant at their mean values. For all denominations except for Disciples of Christ and Episcopal, the age of first intercourse was statistically significantly higher than the "No Religion" group. For the outcome of whether the adolescent had ever engaged in sex as reported at Wave 1, all previously significant differences with the "No Religion" group remained statistically significant when controlling for demographic differences, except for Baptists, where the difference became statistically significant. This suggests that after taking into account demographic confounds, all of the denominations are in the direction of a protective influence for this outcome. For experiencing a pregnancy in the ensuing 12 months, all previously statistically significant differences with the "No Religion" group

became statistically non-significant when controlling for the demographic differences, except for

Methodists which remained statistically significant in a protective direction. In young adulthood,

there were no significant denomination differences with the "No Religion" group for STD rates

once demographic confounds were controlled for.

Long Term Correlates of Adolescent Religious Affiliation

We next examined whether religious affiliation as measured at Wave 1 predicts sexual risk

behavior in young adulthood over and above its impact on sexual risk behavior in adolescence.

The underlying path model that was tested is shown in Figure 1. According to this model,

religious affiliation during adolescence can impact sexual activity in young adulthood through

two mechanisms. First it can impact sexual activity during adolescence (path *a*), which, in turn,

impacts sexual activity in young adulthood (path *b*). Second, it can have independent effects on

sexual activity during young adulthood over and above its effects on adolescent sexual activity

(path *c*).

We tested this model using structural equation modeling for each of the six denominations

using the adolescent sexual behavior outcome of age at first intercourse as the as the primary

index of adolescent sexual behavior. We used this outcome because prior research suggests it

is the best forecaster of future sexual risk. Testing positive for an STD during young adulthood

was the distal outcome. The adolescent predictor of religious affiliation was a dummy variable

that contrasted the denomination in question to the "No Religion" group. The model was tested

using M Plus. The model is just-identified, so global indices of model fit are irrelevant. The

results for path *a* paralleled those described previously in Table 1 and are not re-iterated here.

For path *b*, a statistically significant ($p < 0.05$) coefficient was observed for predicting young

adulthood STDs from the age of first intercourse (unstandardized regression coefficients = .91).

This suggests that adolescent sexual activity predicts sexual risk behavior in young adulthood,

which is consistent with past research. For path *c*, most of the coefficients contrasting a given

denomination with the "No Religion" groups were not statistically significant, suggesting that the

effects of religious affiliation, if any, on sexual outcomes during young adulthood are largely mediated by their more immediate effects on adolescent sexual activity. However, there were two exceptions. Path *c* was statistically significant when comparing STD rates during young adulthood for Baptists versus the "No Religion" group in the direction of Baptists being *more* likely to test positive for an STD (exponent of coefficient = 1.66, $p < .05$, 95% CI = 1.16 to 2.36). By contrast, for Catholics, path c was statistically significant consistent with a long term protective influence (exponent of coefficient = .63, $p < .05$, 95% CI = 0.42 to 0.96). All analyses included controls for the demographic confounds.

Discussion

The present study used a large nationally representative sample of adolescents to examine differences in sexual risk behavior as a function of affiliation with different religious denominations. This has been an overlooked facet of the role of religious variables in the analysis of sexual risk behavior, with most studies examining religiosity rather than religious denomination as a predictor of adolescent sexual activity. Several interesting results emerged that have important applied implications.

First, in recent years, there has been an increased emphasis on faith-based outreach to youth to address adolescent problem behaviors, such as unintended pregnancy and the epidemic surrounding sexually transmitted diseases. We observed substantial variations in adolescent sexual risk behavior as a function of denomination and it is clear that religious leaders in some denominations have a larger challenge in front of them than other denominations. For example, almost 50% of youth in some religious denominations engage in sexual intercourse (e.g., Adventist, AME Zion, CME, Holiness, Christian Science) and in several denominations (e.g., Congregational, Pentecostal, United Church of Christ, Baptist, Muslim), the youth show as much a tendency to engage in sexual intercourse as youth who eschew religious affiliations completely. Even in denominations where the rates of sexual activity are among the lowest (e.g., Mormons, Jews, Episcopalian), it is still the case that about 1 in 5 youth are

sexually active, suggesting that leaders of all denominations need to be concerned about issues surrounding sexual risk behavior.

While it is true that some of the variation in denominational differences is driven by demographic confounds, the demographic make-up of a congregation "is what it is" for purposes of faith-based outreach. For example, Baptists have higher rates of denominational affiliation by African Americans and Mormons are, on average, more affluent than individuals in many other denominations. These ethnic and class differences undoubtedly account for some of the base rates reported in Table 1. Nevertheless, as Baptist religious leaders reach out to their youth, the fact is that they will be reaching out to a significant segment of African Americans. Similarly, as the leaders of the Latter Day Saints reach out to their youth, they will be reaching out to youth with a somewhat more affluent advantage. These features of congregations cannot be "statistically controlled" or "covaried out" in the real world, as they are in statistical models in scientific reports. The "confounds" must be dealt with head on by religious leaders and we must recognize that youth in a given denomination "are what they are" as we outreach to them.

We found that across most denominations, adolescents who were more religious tended to engage in less sexual risk activity, although there were exceptions. For example, religious youth were as likely to experience an STD in young adulthood as non-religious youth. As another example, less religious Baptists were more likely to experience a pregnancy than more religious Baptists, but even very religious Baptists were as likely to experience a pregnancy as youth who eschewed religious affiliations completely (see Table 2). This suggests that even though religious leaders need to be sensitive to youth in their denominations who are less likely to embrace religion, they still must be vigilant even for those whose faith is "very important" in their lives.

Another important finding in the present research was that denominational differences in sexual outcomes often varied, depending on the particular outcome variable in question. For example, whereas Methodists showed lower base rates of sexual intercourse during

adolescence than adolescents who did not affiliate with any denomination, the two groups

tended to be as likely to not use protection if they had sexual intercourse, and the two groups

were about as likely to contract an STD in young adulthood. This indicates that faith based

outreach needs to address the full range of adolescent risk behaviors and not just focus on one

behavior or another. The risk profile of adolescents within a given denomination varies

depending on the sexual risk behavior.

Our research found denominational differences in sexual risk behavior that extended into

young adulthood, some six years after our initial assessments. Some of these differences could

be traced to the denominational differences in adolescent sexual behavior. For example,

denominations that were characterized by youth who delayed the age of first intercourse were,

on average, less likely to have STDs in young adulthood. In most cases, denominational effects

on later STDs were mediated by sexual activity during adolescence but in some cases, such as

with Catholics, we observed independent effects on sexual risk behavior during young

adulthood.

Although we observed at times data that were consistent with the common view that

"religion is protective," it is clear that the underlying dynamics are complex and that in some

cases, religion is not protective. There is considerable individual variability in risk behavior that

has to be dealt with no matter how religious or what the religious denomination of youth are.

Religious leaders would do well to recognize this complexity as they develop and craft their

faith-based outreach.

Although our results are intriguing, they should be interpreted within the methodological

constraints of this study. For some denominations, sample sizes were small, which brings into

question issues of statistical power. Also, measurement error can bias parameter estimates in

our models. With the exception of the STDs, the indices of sexual risk behavior were based on

self-reports, which also suggest the need for caution. Despite these limitations, our results are

suggestive of issues that religious leaders need to take into account as they structure faith

based outreach to youth to reduce unintended pregnancies and STDs in adolescence and young adulthood. The research also suggests that denominational differences matter and that social scientists need to pay more attention to this important facet of religion. In doing so, they must be sensitive to the demographic confounds that are inherent with denominational differences and approach their statistical modeling accordingly.

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Table 1

Sexual Risk Behaviors as a Function of Religious Denomination

Denomination (n)	Ever Had Sex W1	Ever Preg W1**	Age First Intercourse	Sex from W1 and W2	BC from W1 to W2	Became Preg W1 to W2**	Condom use W3	Freq of Sex W3	Number of Partners W3	STD W3
No Religion (2933)	.49	.09	15.8	.49	.71	.06	1.7	65.5	6.4	.06
Buddhist (121)	.15$_a$	.06$_a$	17.6$_a$	.20$_a$	.84	.00$_a$	2.3$_a$	34.5$_a$	1.8$_a$	.09
Latter Day Saints (210)	.20$_a$	.02$_a$	17.6$_a$	.22$_a$	.61	.00$_a$	1.5	68.2	3.6$_a$	.01$_a$
Jewish (142)	.22$_a$	.00$_a$	17.5$_a$	.23$_a$	.85$_a$	.00$_a$	2.0	42.3$_a$	3.6$_a$	.00$_a$
Episcopal (264)	.24$_a$	.04	16.4	.25	.63	.01$_a$	2.0	63.5	4.8$_a$	.02$_a$
Lutheran (643)	.30$_a$	.06	17.0$_a$	.26$_a$	.77	.01$_a$	1.9$_a$	46.3$_a$	5.0$_a$	.03$_a$
Assemblies of God (141)	.31$_a$	.01$_a$	16.18	.37	.72	.05	1.7	47.4	6.6	.06
Methodist (974)	.32$_a$	.03$_a$	16.3$_a$	.37$_a$	.71	.04	1.8	61.9	6.1	.05
Presbyterian (381)	.32$_a$	.03$_a$	17.0$_a$	.28$_a$	.91$_a$	.03	1.7	43.1$_a$	4.5$_a$	.04
Catholic (5406)	.32$_a$	.05$_a$	16.6$_a$	.39$_a$	.70	.04$_{a,b}$	2.0$_a$	50.5$_a$	4.8$_a$	.04
Jehovah's Witness (252)	.33$_a$	.07	16.8$_a$	.34$_a$	.79	.03	1.7	44.9$_a$	3.9$_a$	.09
Other Protestant (637)	.34$_a$	.07	16.2$_a$	.36$_a$	.61	.07	1.7	42.3$_a$	4.8$_a$	.05
Disciples of Christ (2170)	.35$_a$	.08	16.5$_a$	.34$_a$	.72	.04$_a$	2.0$_a$	47.7$_a$	5.0$_a$	.06
Other Religion (622)	.39$_a$	.05$_a$	16.5$_a$	.39$_a$	.78	.02$_a$	1.7	44.4$_a$	5.7	.03$_a$
Congregational (84)	.39	.00$_a$	16.7	.36	.70	.00$_a$	1.9	73.6	5.5	.00$_a$
Pentecostal (555)	.42	.07	15.9	.40$_a$	.73	.04	1.4	47.3$_a$	4.8$_a$	.08
United Church of Chrst (57)	.42	.05	16.6	.35	.50	.00$_a$	1.8	33.7$_a$	5.8	.00$_a$
Baptist (4511)	.45	.11$_a$	16.0	.43	.70	.06	1.9$_a$	50.7$_a$	6.1	.10$_a$
Muslim (79)	.45	.04	16.8	.21$_a$	.95$_a$	.00$_a$	2.9$_a$	26.4$_a$	5.0	.00$_a$
Adventist (91)	.48	.09	16.0	.36	.88	.05	1.6	36.2	5.6	.06
AME Zion, CME (176)	.50	.09	15.9	.48	.71	.06	1.9	52.5	4.9	.15$_a$
Holiness (235)	.54	.12	16.1$_a$	.46	.74	.05	2.0$_a$	34.2$_a$	5.6	.14
Christian Science (61)	.59	.01	16.7	.45	.81	.14	2.0	42.3	4.3	.29

Note: Subscript 'a' indicates significant difference (*p* < .05) from "No Religion" group. Groups in boldface were focus of detailed analyses. Numbers in parentheses are samples sizes at W1. W1 = Wave 1, W2 = Wave 2, W3 = Wave 3; Sex = vaginal sexual intercourse; BC = use of birth control at most recent intercourse. All entries are proportions, except age at first intercourse, condom use, frequency of sex and number of partners, which are means.
** Females only were included in these analyses.

Table 2

Predicted Outcome Scores of Sexual Risk Behavior by Denomination for each Level of Religiosity

	Religiosity Level	Religious Denomination					
		Baptist	Disciples of Christ	Episcopal	Latter Day Saints	Methodist	Catholic
Ever had sex	Not at all important	0.66	0.53	<u>0.39</u>	<u>0.37</u>	0.50	0.49
No Religion: .49	Fairly unimportant	0.58	<u>0.45</u>	0.32	0.30	<u>0.42</u>	<u>0.41</u>
	Fairly important	0.51	0.38	0.25	0.24	0.34	0.33
	Very important	<u>0.42</u>	0.30	0.20	0.18	0.28	0.27
Ever been Pregnant	Not at all important	0.14	0.11	<u>0.06</u>	<u>0.03</u>	<u>0.05</u>	<u>0.07</u>
No Religion: .09	Fairly unimportant	0.12	0.10	0.05	0.03	0.04	0.06
	Fairly important	0.10	0.09	0.04	0.02	0.03	0.06
	Very important	<u>0.09</u>	<u>0.07</u>	0.04	0.02	0.03	0.05
Age 1st sex	Not at all important	15.20	15.70	15.60	<u>16.70</u>	15.50	<u>15.90</u>
No Relig: 15.81	Fairly unimportant	15.50	<u>16.10</u>	<u>15.90</u>	17.10	<u>15.90</u>	16.20
	Fairly important	<u>15.80</u>	16.40	16.30	17.40	16.20	16.60
	Very important	16.20	16.70	16.70	17.70	16.60	16.90
Sex in ensuing	Not at all important	0.67	0.56	0.43	0.44	0.58	0.54
12 months	Fairly unimportant	0.58	0.46	<u>0.34</u>	<u>0.34</u>	0.49	0.44
No Religion: .49	Fairly important	0.48	<u>0.37</u>	0.26	0.27	0.39	<u>0.35</u>
	Very important	<u>0.39</u>	0.28	0.19	0.20	<u>0.30</u>	0.27
Used BC if had sex	Not at all important	0.74	0.75	<u>0.66</u>	<u>0.65</u>	0.74	0.73
in next 12 mths	Fairly unimportant	<u>0.72</u>	0.74	0.64	0.63	<u>0.73</u>	<u>0.72</u>
No Religion: .71	Fairly important	0.70	<u>0.72</u>	0.62	0.61	0.71	0.70
	Very important	0.69	0.70	0.60	0.59	0.69	0.69

Notes: Ever had sex = whether respondent reported having ever engaged in sexual intercourse at W1; Ever been pregnant - whether female respondent reported having ever been pregnant at W1. Age 1st Sex - Age respondent reported having engaged in sexual intercourse for the first time as recalled during the wave 3 interview. BC = use of birth control at most recent intercourse in ensuing year. All scores are proportions, except Age 1st sex scores are means.

Table 3

Demographic Correlates of Religious Denominations

Variable	No Religion	Baptist	Disciples	Episcopal	LDS	Methodist	Catholic
Age of adolescent (mean)	15.74	15.44	15.23$_a$	15.28$_a$	15.74	15.38$_a$	15.51
Gender of adolescent (% female)	44.3	50.6	49.0	50.9	46.0	50.5	49.2
Parental education							
Did not graduate HS	19.5	15.7	14.4	4.7	3.0	7.9	16.2
Graduated HS	29.3	32.8	29.4	10.7	20.3	31.3	28.8
Attended Trade school	19.9	20.7	19.7	11.0	18.6	15.8	18.0
Attended college	17.0	16.9	19.2	20.3	33.9	21.1	17.8
Graduated college	14.3	13.8	17.3	53.4	24.3	23.9	19.2
Parental income	5.21	5.12	5.69$_a$	7.68$_a$	6.65$_a$	6.37$_a$	6.16$_a$
Median Parental income (annual)	$31,000	$31,500	$39,000	$59,000	$44,500	$44,500	$44,500
Race							
White (non-Hispanic)	69.30	61.00	64.9	89.00$_a$	82.5	86.80$_a$	64.20
Black (non-Hispanic)	15.70	34.10$_a$	14.2	7.50	0.40$_a$	10.30	2.20$_a$
Native American	1.60	0.90	0.80	0.00$_a$	1.90	0.50	0.50
Asian	3.60	0.80$_a$	6.10	0.60	8.50	1.30	5.10
Hispanic	9.80	3.20$_a$	14.00$_a$	2.90$_a$	6.80	1.10$_a$	28.00$_a$

Notes: Gender – values represent the percentage of adolescents within the respective religious denomination who identified as female. Parental education - values represent the percentage of parents within the respective religious denomination who identified having achieved that level of education. Race – values represent the percentage of adolescents within the respective religious denomination who identified with the particular racial group; Subscript $_a$ represents statistically significant ($p < .05$) group differences in a row when comparing a denomination with the "No Religion" group.

Table 4

Sexual Risk Behaviors as a Function of Religious Denomination after Controlling for Demographic Confounds

Denomination	Ever Had Sex W1	Ever Pregnant W1**	Age First Intercourse	Sex from W1 and W2	BC from W1 to W2	Became Preg W1 to W2**	Condom use W3	Freq of Sex W3	Number of Partners W3	STD W3
None	.48	.06	15.9	.54	.73	.06	1.7	64.6	6.3	.06
Latter Day Saints	.19$_a$	.02	17.4$_a$	.27$_a$	.70	.00	1.7	57.8	3.7$_a$	.02
Episcopal	.31$_a$	.04	16.2	.36$_a$	.62	.00	2.0	62.1	5.3	.01$_a$
Methodist	.34$_a$	.02$_a$	16.3$_a$	.45$_a$	.69	.04	1.9	60.4	6.0	.06
Catholic	.33$_a$	.04	16.6$_a$	.41$_a$	.72	.03$_a$	2.0	49.4$_a$	5.0$_a$	.05
Disciples of Christ	.38$_a$	.06	16.5	.41$_a$	.74	.04	2.0$_a$	49.3$_a$	5.2$_a$	.06
Baptist	.43$_a$	.06	16.2$_a$	.47$_a$	.68	.06	1.8	54.0$_a$	5.8	.08

Notes: Subscript 'a' indicates significant difference ($p < .05$) from "No Religion" group. Numbers inside parentheses are samples sizes at Wave 1. W1 = Wave 1, W2 = Wave 2, W3 = Wave 3; Sex = vaginal sexual intercourse; BC = use of birth control at most recent intercourse. All entries are proportions, except age at first intercourse, condom use, frequency of sex and number of partners, which are means. ** Females only were included in these analyses.

Figure 1: Path Model of Relationship between Adolescent Religious Affiliation and Sexual Behavior
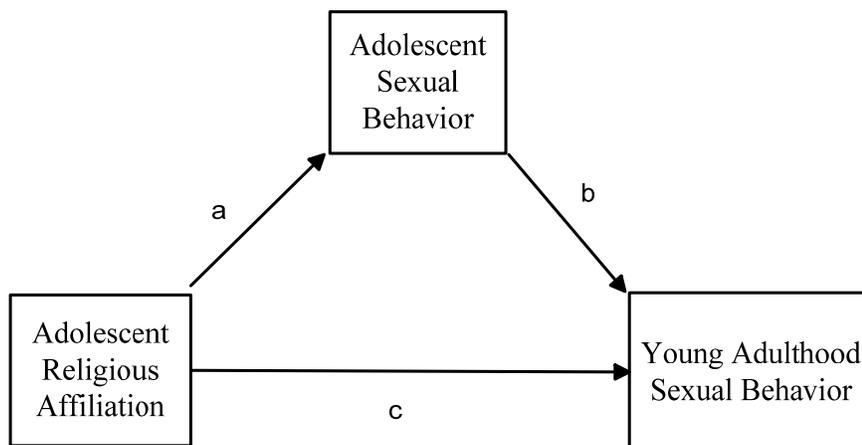
Belief in Guardian Angels and Sexual Risk Taking

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Abstract

Sexual risk behavior in unmarried young adults is alarmingly high. Religiosity is a broad, multi-faceted construct that is often cited as a protective mechanism. However, inconsistent findings when using global religiosity constructs reveals the need for more nuanced approaches. This study examined a specific facet of religiosity – namely belief in guardian angels - and its relationship to sexual risk behavior for a nationally representative sample of young adults using the National Longitudinal Study of Adolescent Health. Belief in a guardian angel was associated with higher rates of STDs and more sexual partners, independent of religiosity. These findings suggest that specific religious beliefs may impact sexual risk taking in ways that are different to the traditional, global constructs of religiosity and such beliefs should be given greater attention in the research.

Belief in Guardian Angels and Sexual Risk Taking

Numerous studies have observed an association between religiosity and adolescent health (e.g., Yarnold, 1992, Benda & Corwyn, 2000; Wright, Frost & Wisecarver, 1993). Religion is a central part of the lives of Americans. In 1999, almost 95% of Americans said they believed in God or a higher power (Gallup & Lindsay, 1999). In 1998 Gallup polls, 60% of Americans reported religion to be very important in their lives (Gallup & Lindsay, 1999). However, religion is a multifaceted construct which has traditionally been examined using global constructs, such as religiosity and church attendance (Rostosky, Wilcox, Wright & Randall, 2004).

Research suggests that religion serves as a protective mechanism with regard to sexual risk behavior in young adulthood (e.g. Cotton, Zebracki, Rosenthal, Tsevat, & Drotar, 2006; Rostosky, Regnerus, & Wright 2003). However, some studies report results that are inconsistent with this thesis (Donnelly, Duncan, Goldfarb, & Eadie 1999). This suggests a more nuanced approach may be fruitful that examines specific mechanisms that link religious constructs to sexual risk behavior. The concept of religiosity encompasses a variety of specific beliefs which can operate to impact behavior independent of the more global religiosity construct. One such specific facet that is rarely considered is a person's belief in guardian angels. Belief in angels is widespread in the United States. For example, a national Harris Poll (2005) found that 68% of the respondents believed in angels. In 2006, an Associated Press national poll found that 80% of Americans believe in angels (Woodward, 2006). The belief in angels is not limited to Christian denominations. Most world religions profess belief in angelic beings as part of their religious doctrine. Despite the preponderance of such beliefs, no studies could be found that examine the relationship between belief in angels and sexual risk behavior, independent of religiosity.

Belief in a guardian angel may relate to sexual risk behavior because it functions as a proxy for the more global concept of religiosity, whose relationship to sexual risk taking is well

documented. However, other mechanisms may operate so that beliefs in angels have independent effects. One possibility is that a person's belief in angels provides comfort and a sense of security. Belief in angels may be protective in the sense that it gives people confidence in approaching difficult situations and thereby helps them cope with problems by virtue of this increased confidence, independent of religiosity. An opposing logic is that belief in guardian angels is risk inducing because it fosters an external locus of control. The present study examines how belief in guardian angels predicts sexual risk behavior independent of more global measures of religiosity.

Method

Respondents

Data were analyzed from the National Longitudinal Study of Adolescent Health (Add Health; Bearman, Jones, & Udry 1997). For methodological details and descriptions of all variables used in this study, see www.cpc.unc.edu/addhealth. The first wave of the study included interviews with a nationally representative, school-based sample of 20,745 adolescents in grades 7 to 12, and their mothers. These youth were re-interviewed six years later (N=15,170). The latter interviews comprise the data for this study.

Measures

Belief in guardian angels was measured with the question, "Angels are present to help or watch over me." Responses were on a 5 point disagree-agree scale. Religiosity was measured by the question "How important is your religious faith to you?" Responses ranged from 1 to 4 ("not important," to "more important than anything else.") Church attendance was measured with the question, "How often have you attended religious services in the past 12 months?" with a response metric from 0 (never) to 6 (more than once a week).

Four measures of sexual risk taking were obtained (a) frequency of sexual intercourse in the past 12 months, (b) condom use consistency in the past 12 months (estimating how often they used a condom on a 0 (none) to 4 (all the time) metric), (c) the number of sexual partners

in the past 12 months, and (d) the results of an STD test for chlamydia, gonorrhea, and trichomoniasis from urine samples provided by respondents (see AddHealth website for details).

Analytic strategy

Add Health employed a clustered sampling design, with sampling weights calculated by Add Health statisticians. Tests for non-informativeness of weights (DuMouchel & Duncan, 1983; Pfeffermann, 1993) suggested the weights were non-informative for the current analyses. Unweighted analyses are reported to maximize statistical efficiency. Bootstrapped regression analysis or logistic regression analysis were conducted. Analyses were on unmarried youth.

Results

Table 1 presents descriptive statistics on selected variables. The correlations between belief in guardian angels and two measures of religiosity, religious importance (r = .49, $p < .05$) and church attendance (r = .33, $p < .05$), were moderate, indicating that belief in guardian angels is distinct from religiosity.

The regression analyses are reported in Table 2. Belief in angels was significantly ($p < 0.05$) positively related to the number of sexual partners and the likelihood of a positive STD test. To make the relationships concrete and ignoring covariates, the percentage of the sample that tested positive for an STD when the belief rating for guardian angels was 1 (strongly disagree) was 3.1%, and for scores of 2, 3, 4, and 5 (strongly agree), they were 4.9%, 5.6%, 8.5% and 10.8%, respectively. The corresponding means for number of partners were 1.50, 1.62, 1.58, 1.57 and 1.47, suggesting a possible curvilinear effect. A polynomial term for belief in angels was statistically significant in a follow-up analysis.

Discussion

The present study found that belief in a guardian angel was associated with higher rates of STDs and more sexual partners (but with a possible drop off at high levels of belief), independent of indices of religiosity. These are intriguing findings and are consistent with the logic that belief in a guardian angel may foster some sense of external locus of control, a

possibility that should be followed up in more detail. The findings suggest that specific religious beliefs may impact sexual risk taking over and above global measures of religiosity and even in ways that are opposite to traditional trends relating religiosity to sexual risk taking. Hence, such beliefs warrant greater attention. Embracing religion may have mixed effects, with different aspects of religion having protective or risk-inducing effects.

Although provocative, the results must be interpreted cautiously. Most of the outcome measures were self reports. Measurement and specification error can bias parameter estimates. The data were cross-sectional and do not permit causal inference. Despite this, the results should encourage adolescent researchers to focus more attention on specific religious beliefs.

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Table 1

Descriptive Statistics for Sample

Variable	Value
Gender (% male)	48.9%
Race	
White (non-Hispanic)	52.7%
Black (non-Hispanic)	23.8%
Hispanic	15.0%
Asian	7.6%
Native American	0.9%
Age (Mean)	21.7
Education level of mother (Mode)	3.0
Religiosity (Mean)	2.44
Church attendance (Mean)	1.97
STD (% tested positive)	0.08
Frequency of sex – 12 months (Mean)	44.12
# of partners – 12 months (Mean)	1.55
Condom consistency (Mean)	2.04

Note: Sample size = 12,623; All youth in sample are unmarried; a value of 3 on education scale is high school graduate; for religiosity, 1 = not important, 2 = somewhat important, 3 = very important, 4 = more important than anything; for church attendance, 0 = never, 1 = a few times, 2 = several times, 3 = once a month, 4 = 2 or 3 times a month, 5 = once a week, 6 = more than once a week; for condom consistency, 0 = none, 1 = some, 2 = half, 3 = most, 4 = all

Table 2

Regression Coefficients for Prediction of Sexual Risk Behaviors from Belief in Angels Controlling for Demographic Characteristics

Variable	Frequency of Sex B	95% CI	Condom Consistency B	95% CI	Number of Partners B	95% CI	Tested Positive STD Exp (B)	95% CI
Belief in Angels	-0.52	-2.18 to 1.15	0.02	-0.01 to 0.05	0.05	0.01 to 0.08	1.12	1.02 to 1.22
Church Attend	-3.73	-4.53 to -2.94	0.04	0.02 to 0.07	-0.10	-0.12 to -0.08	0.92	0.89 to 0.97
Religiosity	-4.62	-6.96 to -2.28	-0.01	-0.06 to 0.04	-0.05	-0.11 to 0.02	1.01	0.90 to 1.13
Dgender	-1.92	-4.69 to 0.86	0.37	0.31 to 0.43	0.40	0.32 to 0.49	0.76	0.65 to 0.89
Dblack	-13.11	-16.35 to -9.99	0.44	0.36 to 0.52	0.42	0.30 to 0.54	6.02	5.00 to 7.24
DNativeAmerican	12.35	-6.80 to 31.49	-0.87	-0.40 to 0.23	-0.08	-0.40 to 0.25	3.33	1.74 to 6.36
DAsian	-18.55	-23.51 to -13.59	0.13	-0.10 to 0.27	-0.45	-0.60 to -0.30	1.80	1.28 to 2.53
DHispanic	-9.38	-13.72 to -5.04	0.24	0.14 to 0.33	-0.17	-0.27 to -0.07	1.69	1.31 to 2.19
Age	2.52	1.80 to 3.23	-0.08	-0.10 to -0.06	-0.01	-0.03 to 0.02	0.98	0.94 to 1.02
Maternal Educ.	0.72	-0.20 to 1.64	0.03	0.01 to 0.05	-0.01	-0.04 to 0.01	0.88	0.84 to .93
Intercept	17.32	-	3.13	-	1.74	-	0.09	-

Notes: Exp = exponent of the logistic coefficient; 95% CI = 95% confidence interval for coefficient or exponent of the logistic coefficient; D indicates a dummy variable, scored 1 and 0, with White (non-Hispanic) as reference group for ethnicity and females as reference group for gender; for all outcomes other than STD, if 95% CI does not contain 0, then $p < 0.05$; for STDs, if 95% CI does not contain 1.00, then $p < 0.05$

Outreaching to Adolescents through Religious Organizations:

Examination of Belief Structures about Sex and

Birth Control of Youth who Attend Religious Services

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Abstract

This study examined adolescent beliefs about sex and birth control for a nationally representative sample of youth using a prospective design to predict sexual risk behavior. Faith based outreach is most likely to reach youth who attend church. We evaluated whether beliefs varied as a function of attendance at religious services in terms of their mean values and their relationship to sexual behavior. Mean differences in many beliefs were observed as a function of religious service attendance. However, structural coefficients linking beliefs to behavior tended not to vary as a function of attendance at religious services. An unanticipated over-confidence effect was found in that the more confident youth were in their efficacy beliefs about using birth control, the more likely they were to have unprotected sex in the future.

Outreaching to Adolescents through Religious Organizations:
Examination of Belief Structures about Sex and Birth
Control of Youth who Attend Religious Services

Unintended adolescent pregnancies have been a major problem in the United States (Jaccard, 2009). Although birth rates for adolescents have declined substantially during the past 15 years, recent analyses have found that adolescent birth rates are increasing again (MMWR, 2009). The United States currently has one of the highest teen pregnancy rates of all the developed countries (Singh & Darroch, 2000). On average, more than 1,500 female adolescents in the United States become pregnant every day (MMWR, 2000). Sexually transmitted diseases (STDs) also are widespread among adolescents. About five percent of teenage males and five to ten percent of teenage females are infected with chlamydia. Between 15 and 20 percent of American youth will become infected with herpes by the time they reach adulthood (CDC, 2000). Because of such trends, policy makers and social scientists have sought to develop intervention programs to reduce adolescent sexual risk behavior.

Most such programs outreach to adolescents through schools (in the form of sex education classes) or health clinics, usually with mixed success (for a review, see Kirby & Miller, 2002; Kirby, 2007). Recently, there has been renewed interest in faith-based interventions, whereby religious organizations outreach to youth, usually when youth attend religious services or when they participate in organized religious activities. Faith based efforts are stereotypically associated with abstinence-only sex education, but such a focus is not necessary. Faith based programs take many forms. As examples, Green and Sollie (1989) evaluated a ten hour church-based sex education program that adopted a curriculum addressing sexual identities, sex roles, premarital sex, contraception, abortion, homosexuality and sexual arousal. Coyne-Beasley and Schoebach (2000) interviewed 34 African-American ministers and clergy about topics they would be willing to address in youth programs. Responses included AIDS, abstinence, contraception, homosexuality, premarital sex, and abortion, to name a few.

As faith-based outreach efforts increase, it is important that we understand the characteristics of adolescents who are most likely to be exposed to interventions delivered through religious organizations and how these youth differ from the general population of adolescents. More often than not, faith-based efforts reach youth who attend religious services on a regular or semi-regular basis. A large number of studies have found that youth who attend church regularly are likely to delay engaging in sex (e.g., Studer & Thornton, 1987), but the mechanisms underlying this tendency are complex and not necessarily religious-linked (Hospital, Jaccard & Garcia, 2009). Religious service attendance has been an inconsistent predictor of adolescent contraceptive and condom use (Studer & Thornton, 1987; Zaleski & Schiaffino, 2000; Miller & Gur, 2002), as well as the occurrence of unintended adolescent pregnancies (Hospital, Jaccard & Garcia, 2009b). Thus, youth who attend church on a regular to semi-regular basis remain at risk, and effective interventions to address their sexual risk behavior are needed.

As religious leaders structure programs to outreach to youth who attend religious services, it is important for them to understand the kinds of beliefs and attitudes that underlie the behavior of their target audience. The present research addresses this issue. We focus on two classes of beliefs, a set of beliefs related to engaging in sexual intercourse and a set of beliefs related to using birth control. Analyses are reported for a large, nationally representative sample of youth using a prospective design to predict sexual activity and use of birth control from such beliefs. We evaluate how the beliefs differ as a function of attendance at religious services and whether the structural coefficients linking the beliefs to sexual risk behavior vary as a function of attendance at religious services. These analyses will identify the unique characteristics of youth who attend church on a regular or semi-regular basis vis-a-vis these beliefs, thereby providing faith-based educators with a better sense of their target population and possible strategies for structuring intervention efforts.

Method

Respondents

The study used data from the National Longitudinal Study of Adolescent Health (Add Health; Bearman, Jones, & Udry 1997). This is a large scale, nationally representative data base that initially interviewed 20,745 adolescents in grades 7 to 12. The sampling frame was based on a random sample of 80 high schools stratified by region, urbanicity (urban-suburban-rural), school type (public-private-parochial), ethnic mix, and size. For each high school, a set of "feeder" schools, which included 7th graders, was identified. Some high schools included grades 7 to 12 and functioned as their own feeder school. A total of 134 discrete schools were studied.

Approximately 200 adolescents were selected from each of the schools, including several strategic over-samples (e.g., Blacks with parents who had a college degree). Sampling weights were derived by Add Health statisticians to permit inferences that are nationally representative. A parent, in most cases the resident mother, was asked to complete a questionnaire covering topics that overlapped with the adolescent questionnaire as well as information about the economic status of the household.

The sexual and contraceptive beliefs were asked only of youth who were 15 years of age or older (corresponding roughly to 10th through 12th grades). Hence these youth are the focus of the current analysis.

Procedure

In-home interviews were conducted with students and their mothers. Data were recorded on laptop computers. The interviewer read the questions and entered the respondent's answers. For more sensitive sections, the respondent listened to prerecorded questions through earphones and entered the answers directly (audio-CASI). Respondents were reassured of the confidentiality of their responses and could skip any questions that they felt uncomfortable about

answering. Adolescents and mothers were interviewed separately.

The interview included a wide range of topics about health status, health facility utilization, nutrition, peer networks, decision-making processes, family composition and dynamics, educational aspirations and expectations, to name a few.

Adolescents were interviewed a second time (Wave 2) approximately 1 year after the first interview. Respondents who were in grade 12 during Wave 1 were not interviewed at Wave 2. Parents were only interviewed during Wave 1. No significant attrition biases were observed across a range of demographic variables, with sampling weights adjusting for attrition and missing data across waves.

Measures

Attendance at Religious Services. At Wave 1, attendance at religious services was measured by asking youth "In the past 12 months, how often did you attend religious services?" Responses were 0= "never," 1 = "less than once a month," 2 = "less than once a week but at least once a month," 3 = "once a week or more."

Sexual Behavior. At Wave 1, respondents were asked whether they had ever engaged in vaginal sexual intercourse (virgin status). At Wave 2 (one year after Wave 1), respondents were asked if they had engaged in sexual intercourse since the prior interview (using standard time-line follow-back procedures). If the adolescent engaged in sexual intercourse between Waves 1 and 2, questions were asked to determine if they had used some form of contraceptive protection at their most recent intercourse.

Beliefs about Sexual Activity. Fourteen beliefs were measured about the perceived advantages and disadvantages of engaging in sexual intercourse. The content of the items was based on literature reviews of beliefs associated with adolescent sexual behavior. Each item was responded to on a 5 point agree-disagree scale, with higher scores indicating higher levels of agreement. The content of all items is reflected in tables reported in the Results section.

Examples include "If I had sexual intercourse, my friends would respect me more"; "If I had sexual intercourse, afterward, I would feel guilty"; and "If I had sexual intercourse, it would give me a great deal of physical pleasure". Wording of items was adjusted to the gender of the respondent, although we use phrasing for females in this report.

Beliefs about Birth Control. Beliefs about the use of birth control were derived from two categories of beliefs, efficacy beliefs and behavioral beliefs. Efficacy beliefs focused on the perceived ability to use protection under different circumstances. Five items were assessed. The first three items were assessed on 5 point unsure-sure scales (very unsure, moderately unsure, neither, moderately sure, very sure) and included the items: "How sure are you that you could resist sexual intercourse if your partner did not want to use some form of birth control?"; "If you wanted to use birth control, how sure are you that you could stop yourself and use birth control once you were highly aroused or turned on?"; and "How sure are you that you could plan ahead to have some form of birth control available?" The fourth and fifth items were assessed on a five point agree-disagree scale and were: "It would be too hard to get a boy to use birth control with me" and "It is easy for me to get birth control." For behavioral beliefs, six items reflecting perceived disadvantages or hassles of using birth control were assessed on five-point agree-disagree scales. The items included (a) "In general, birth control is too much of a hassle to use"; (b) "In general, birth control is too expensive to buy"; (c) "It takes too much planning ahead of time to have birth control on hand when you're going to have sex"; (d) For me, using birth control would interfere with sexual enjoyment"; (e) "Using birth control is morally wrong"; and (f) "If I used birth control, my friends might think I was looking for sex."

Analytic Strategy

Analyses used logistic and multiple regression–based methods with robust estimators as implemented in the M Plus and SPSS (complex samples) computer programs. Add Health employed a stratified cluster sampling design. Student-level sampling weights were developed

by the Add Health statisticians (Tourangeau & Shin, 1998). The community from which the school was sampled was the primary sampling unit (PSU). Strata were defined in accord with the clustered sample design. One set of analyses regressed each individual belief onto religious service attendance. No covariates were included in these analyses because our focus was descriptive not explanatory, i.e., we wanted to document how youth who frequently attend religious services differ in their beliefs from youth who attend religious services less frequently. The second set of analyses was explanatory in nature and estimated structural coefficients for each belief as a predictor of sexual activity and use of birth control over the ensuing 12 months. These analyses included as covariates adolescent age, parental income, parental education, virgin status, and attendance at religious services. To determine if the structural coefficients varied as a function of attendance at religious services, product terms between the beliefs and religious service attendance were formed and included in the equations to test for statistical interactions (Jaccard & Turrisi, 2003).

Subgroup analyses were conducted by gender and ethnicity. For analyses on the total sample, gender and ethnicity also were included as covariates with those already mentioned. For the gender models, ethnicity was also included as a covariate; for the ethnicity models, gender was also included as a covariate. Gender and ethnic differences in structural coefficients were evaluated using product terms.

<div align="center">Results</div>

Table 1 presents descriptive statistics for the sample. Table 2 presents the unstandardized regression coefficients indicating how adolescent endorsement of beliefs about birth control varied as a function of attendance at religious services. In terms of contraceptive efficacy, it can be seen that those youth who were more frequent attendees of religious services were more apt to believe they could stop and use birth control even if they are highly aroused. However, they were less likely to believe they could resist having sex if their partner did not want to use birth control.

For the perceived negative consequences of using birth control, more frequent attendees of religious services were more apt to believe that using birth control is morally wrong, that doing so would suggest to their friends that they are looking for sex, and that birth control would be difficult to get. On all other contraceptive-related beliefs, there was no difference in belief endorsement as a function of attendance at religious services.

Table 3 presents data comparable to that of Table 2 but where the focus is on beliefs about engaging in sexual intercourse. For the total sample, the frequency of attendance at religious services was related to almost every belief. As a general trend, those who attended religious services more frequently were less likely to endorse positive consequences associated with sexual intercourse and more likely to endorse negative consequences associated with sexual intercourse.

Tables 4 and 5 present the exponents of the logistic coefficients for predicting sexual activity in the ensuing 12 months and for predicting the use of birth control at one's most recent intercourse, respectively. We tested for differences in structural coefficients as a function of religious service attendance using product terms. With only minor exceptions (noted in Tables 4 and 5), there were no statistically significant differences.

Discussion

Faith-based outreach efforts to prevent adolescent pregnancy have become increasingly popular. Outreaching to youth through religious organizations is an important strategy for addressing the large number of unintended pregnancies in American youth. Faith-based programs are most likely to reach youth who attend religious services frequently, so it is important to know if such youth differ in their sex-related beliefs from the general adolescent population and if they differ in how these beliefs are associated with sexual behavior. In other words, religious leaders need to "know their target population" to formulate effective intervention

efforts. The present research addressed this neglected topic. Several interesting results were observed.

First, for the use of birth control, we found that more frequent attendees of religious services were no different from the general population on some contraceptive related beliefs, but not others. For example, more frequent attendees were not much different in their beliefs that birth control is a hassle to use, that it takes too much planning, and how hard it would be to get a partner to use birth control relative to less frequent attendees. However, they were more likely to believe that birth control would be hard to get, that there would be stigma attached to using birth control, and that using birth control is morally wrong. Interestingly, the structural coefficients linking contraceptive beliefs to contraceptive behavior did not vary as a function of frequency of attendance at religious services. This suggests that the kinds of motivations and attitudes influencing birth control use are roughly the same for adolescents who faith-based programs reach as it is for the general adolescent population. Almost all religious leaders agree that young, unmarried adolescents should not be engaging in sexual intercourse. However, there is disagreement about whether interventions should encourage youth to use birth control if they engage in sex. For those religious leaders who want to encourage use of birth control if an adolescent engages in sexual intercourse, our analysis suggests that all of the contraceptive related beliefs we identified may impact future use of birth control. Hence, they need to be addressed in one form or another.

An important and unanticipated result in the present study was the inverse relationship between several of the contraceptive efficacy beliefs and the use of birth control in the ensuing 12 months: The *more* confident that youth were in their ability to plan ahead, their ability to stop and use birth control if highly aroused, and their ability to get a partner to use birth control, the *less* likely they were to have used birth control at their most recent intercourse. This is

consistent with an over-confidence effect, whereby adolescents think they have the skills to do these things in the abstract, but when placed in an actual situation where such skills are required, it turns out to be much harder than the adolescent anticipated. Interventions need to address such dynamics.

In terms of engaging in sexual intercourse, with some exceptions, we found that the structural coefficients linking beliefs about the advantages and disadvantages of engaging in sexual intercourse did not vary as a function of frequency of attendance at religious services. This suggests that the kinds of motivations and attitudes influencing sexual activity are roughly the same for adolescents who attend religious services frequently as they are for the general population. As such, faith-based programs can draw upon the approaches and strategies used in extant evidence-based programs for preventing sexual risk behavior and these should be as effective for faith-based target populations as they are for the general population. To be sure, youth who frequently attend religious services are more likely to endorse or disavow a wide range of beliefs about engaging in sex relative to the general population (see Table 3). However, the dynamics by which these beliefs translate into behavior (Tables 4 and 5) are, based on our analysis of structural coefficients, comparable for youth who attend religious services often relative to those who do not. There were two exceptions to this conclusion (at least for the total sample). First, issues surrounding respect from one's friends had a stronger impact on sexual activity for those who attend religious services frequently relative to those who attend religious services less frequently. Second, issues surrounding embarrassing one's family were a stronger predictor of sexual activity for those who attend religious services more frequently relative to those who attend religious services less frequently.

An important pattern of results that emerged in Table 5 was the fact that many of the beliefs focusing on the positive consequences of engaging in sex were the most important predictors of future sexual activity. This suggests that youth are tuned into the positive social and relationship implications of having sexual intercourse, as well as the physical pleasures of

doing so. These topics are rarely addressed in interventions. Instead, interventions tend to focus on unintended pregnancies and sexually transmitted diseases. In light of the importance of positive expectancies/beliefs, faith based interventions (as well as interventions more generally) need to broaden their focus to take into account such variables. It is not enough to bombard adolescents with information about the negative consequences of sexual intercourse. Rather, we must be attuned to the "attractors" that are operating and help adolescents put these in proper perspective.

As seen in Table 3, frequent attendees of religious services differ from those who do not attend religious services frequently on their endorsement of a wide variety of beliefs related to sexual activity. As a general trend, religious leaders likely will interact with youth who are apt to disavow the positives of engaging in sexual intercourse and to embrace the negative consequences of having sex. Religious leaders should not be lulled into a sense of "my job is done" because of this. Table 1 makes clear that the mean levels for many of these beliefs are moderate in magnitude relative to the scale metric, suggesting that there is plenty of room for movement and improvement, even taking into account the more pronounced belief levels of frequent attendees of religious services.

The results of this study, of course, must be interpreted within the context of the methodological limitations of the study design. The outcome measures were based on self reports, which can be biased. Measurement and specification error can bias parameter estimates. The data were correlational and do not permit causal inference. Despite these limitations, the results are intriguing and suggest that (a) faith-based approaches can usefully draw upon extant evidence-based programs to reduce early sexual activity, (b) that although the target populations of faith based efforts will tend to espouse beliefs that are more conducive to lower levels of sexual activity, these beliefs can still be strengthened to good effect, (c) that interventions need to address the "attractors" for sexual intercourse, not just issues surrounding

pregnancy and STDs, and (d) that over-confidence effects need to be dealt with when addressing contraceptive efficacy. Future research on strategies for strengthening faith based programs is needed.

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Table 1

Descriptive Statistics for the Sample

	Total	Males	Female	White	Black	Asian	Latino
Ever engaged in sex wave 1 (virgin status)	46%	47%	45%	43%	65%	24%	43%
Engaged in sex between wave 1 and 2	50%	49%	51%	49%	63%	24%	47%
Used birth control during most recent intercourse	72%	73%	72%	73%	75%	56%	66%
Attended services during past year (0 to 3 metric)	1.60	1.52	1.69	1.52	1.86	1.80	1.69
Beliefs about Birth Control (1 to 5 metric)							
Could stop and use bc once highly aroused	1.96	2.01	1.90	1.94	1.93	2.23	2.00
Could plan ahead to have bc available	1.63	1.68	1.58	1.59	1.62	1.94	1.76
Could resist sex if partner did not want to use bc	1.86	2.11	1.59	1.82	1.89	1.99	1.99
Hard to get partner to use bc with me	2.17	2.19	2.16	2.10	2.22	2.47	2.43
Easy for me to get bc	3.61	3.64	3.59	3.62	3.80	3.23	3.47
BC is too much of a hassle to use	1.98	2.10	1.86	1.86	2.22	2.14	2.29
BC is too expensive	2.12	2.20	2.05	2.06	2.17	2.20	2.38
Too much planning to have bc on hand	2.11	2.25	1.96	2.00	2.21	2.42	2.44
Would interfere with sexual pleasure	2.24	2.46	2.00	2.20	2.23	2.37	2.43
Is morally wrong	1.91	2.02	1.79	1.83	1.97	2.23	2.14
Friends might think I was looking for sex	2.54	2.70	2.37	2.46	2.61	2.89	2.78
Beliefs about Sex (1 to 5 metric)							
Friends would respect me more	2.38	2.72	2.03	2.32	2.62	2.38	2.43
Partner would lose respect for me	2.56	2.49	2.64	2.58	2.36	2.75	2.63
Would feel guilty	3.08	2.86	3.32	3.13	2.85	3.59	3.01
Would upset my mother	3.98	3.78	4.20	4.03	3.77	4.40	3.90
Would give me great deal of physical pleasure	3.35	3.66	3.02	3.37	3.33	3.27	3.28
Would be relaxing	3.07	3.38	2.75	3.07	3.12	2.96	3.01
Would make me more attractive to boys/girls	2.42	2.70	2.13	2.41	2.49	2.45	2.40
Would feel less lonely	2.52	2.84	2.18	2.50	2.58	2.62	2.53
If got pregnant, would embarrass family	3.69	3.64	3.73	3.83	3.13	4.37	3.45
If got pregnant, would be embarrassing for me	3.68	3.57	3.79	3.85	3.16	4.11	3.29
If got pregnant, would have to quit school	2.42	2.47	2.37	2.45	2.08	2.91	2.55
If got pregnant, have to marry just to get married	2.85	2.97	2.72	2.91	2.45	3.53	2.85
If got pregnant, would have to grow up too fast	3.87	3.74	4.00	3.99	3.49	3.89	3.74
If got pregnant, have to decide about abortion	3.86	4.02	3.69	3.92	3.62	4.15	3.76

Notes: Values represent means unless otherwise noted; BC= birth control

Table 2

Relationship between Endorsement of Beliefs about Birth Control and Religious service attendance

	Total	Females	Males	White	Black	Asian	Latino
Could stop and use bc once highly aroused	.07*	.08*	.06*	.09*$_{c,e}$	.01$_b$	.05	.02$_b$
Could plan ahead to have bc available	.01	.04*	.00	.02$_{c,d}$	-.04$_{b,d}$	.13*$_{b,c}$	.00
Could resist having sex if partner did not want to use bc	-.06*	.00$_a$	-.08*	-.04*$_c$	-.13*$_b$	-.01	-.11*
Hard to get partner to use bc	-.01	.00	-.01	.00$_d$	-.05	.09*$_{b,e}$	-.05$_d$
Easy for me to get bc	-.04*	.00$_a$	-.06*	-.04*	-.05	.03	-.12*
BC is too much of a hassle to use	-.01	.02$_a$	-.03	-.02	-.03	.06	-.03
BC is too expensive	-.04*	-.08*$_a$	-.01	-.05*$_c$	.03$_{b,e}$	.04$_e$	-.12*$_{c,d}$
Too much planning to use bc	-.02	.01	-.04*	-.05*$_d$	-.04$_d$	.09*$_{b,c}$	.02
Would interfere with sexual pleasure	-.02	.01$_a$	-.04*	-.04*$_{c,d}$	-.07*$_d$	.09*$_{b,c}$	-.02
Is morally wrong	.09*	.12*$_a$	.08*	.09*$_c$	.02$_{b,d}$	.20*	.09*
Friends might think I was looking for sex	.08*	.14*$_a$	.04*	.09*$_c$	.01$_b$	.08	.03

Notes: BC= birth control; Entries are unstandardized coefficients; * signifies coefficient was significant, $p < .05$; $_a$ signifies coefficient is significantly different from males within gender, $p < .05$; $_b$ signifies that coefficient is significantly different from Whites within ethnicity, $p < .05$; $_c$ signifies that coefficient is significantly different from Blacks within ethnicity, $p < 0.05$; $_d$ signifies coefficient is significantly different from Asians within ethnicity, $p < .05$; $_e$ signifies that coefficient is significantly different from Latinos within ethnicity, $p < .05$.

Table 3

Relationship between Endorsement of Beliefs about Sexual Behavior and Religious Service Attendance

	Total	Females	Males	White	Black	Asian	Latino
Friends would respect me more	-.07*	-.04*	-.05*	-.08*$_d$	-.08*$_d$	.04$_{b,c,e}$	-.09*$_d$
Partner would lose respect for me	.15*	.16*$_a$	.13*	.18*$_{c,d}$	.10*$_b$	.07*$_b$	.12*
Would feel guilty	.27*	.30*$_a$	.23*	.33*$_{c,d,e}$	.15*$_b$	.14*$_b$	.23*$_b$
Would upset my mother	.25*	.22*	.25*	.28*$_{c,d}$	.21*$_b$	.11*$_{b,e}$	.27*$_d$
Would give me great deal of physical pleasure	-.09*	-.10*$_a$	-.05*	-.07*$_e$	-.10*$_e$	-0.04$_e$	-.20*$_{b,c,d}$
Would be relaxing	-.12*	-.10*	-.10*	-.10*$_e$	-.13*$_e$	-.12*	-.20*$_{b,c}$
Would make me more attractive to boys/girls	-.05*	-.02	-.05*	-.04*	-.07	-.05	-.08*
Would feel less lonely	-.06*	-.02	-.06*	-.06*	-.03	-.05	-.08*
If got pregnant, would embarrass family	.16*	.14*	.18*	.21*$_d$	.16*$_d$	-.02$_{b,c,e}$	.18*$_d$
If got pregnant, would be embarrassing for me	.18*	.17*	.18*	.23*$_d$	.18*$_d$	.05$_{b,c}$	.15*
If got pregnant, would have to quit school	.05*	.05*	.05*	.06*$_c$	-.01$_{b,e}$	.02	.08*$_c$
If got pregnant, might have to marry just to get married	.12*	.16*$_a$	.10*	.17*$_{c,e}$	.07*$_b$	.06	.03$_b$
If got pregnant, would have to grow up too fast	.08*	.08*	.06*	.11*$_c$	.04$_b$	.05	.09*
If got pregnant, would have to decide about abortion	-.03	-.07*$_a$	.03	-.03	-.01	.05	-.03

Notes: Entries are unstandardized regression coefficients; * signifies coefficient was significant, $p < .05$; $_a$ signifies coefficient is significantly different from males within gender, $p < .05$; $_b$ signifies that coefficient is significantly different from Whites within ethnicity, $p < .05$; $_c$ signifies that coefficient is significantly different from Blacks within ethnicity, $p < 0.05$; $_d$ signifies coefficient is significantly different from Asians within ethnicity, $p < .05$; $_e$ signifies that coefficient is significantly different from Latinos within ethnicity, $p < .05$.

Table 4

Structural Coefficients Predicting Contraceptive Behavior from Contraceptive Beliefs

	Total	Females	Males	White	Black	Asian	Latino
Could stop and use bc once highly aroused	.83*	.81*	.84*	.83*	.80*	.99	.81a
Could plan ahead to have bc available	.84*	1.02 (.88)	.82*	.81*	.85	.91	.86a
Could resist sex if partner did not want to use bc	.94a	.87*	.97	.91a	.91	0.90	.95a
Hard to get partner to use bc with me	.78*	.77*	.78*	.73*	.81*	.21* (1.51)	1.01
Easy for me to get bc	1.14*	1.19*	1.04	1.20*	.97	1.30	1.12
BC is too much of a hassle to use	.85*	.80*	.89*	.84*	.82*	.65 f	.91
BC is too expensive	.82*	.83*	.81*	.81*	.80*	.69	.79*a
Too much planning to have BC on hand	.83*	.83*	.82*	.79*	.80*	.75	.99
Would interfere with sexual pleasure	.80*	.73*	.86*	.78*	.83*	.19* (1.70)	.89a
Is morally wrong	.90*	.88a	.92a	.93	.81*	.61a	.93
Friends might think I was looking for sex	.91*	.89*	.91a	.90*	.92	.81	.84a

Notes: All analyses included age, parental income, maternal education and virgin status as covariates. For the gender models, ethnicity was also included as a covariate; for the ethnicity models, gender was also included as a covariate; Values are exponents of logistic coefficients; * signifies coefficient was significant, $p < .05$; if there is an accompanying number in parentheses, this means interaction with religious service attendance was significant, $p < 0.05$, and value in parentheses is the exponent of the product term coefficient and other term is exponent of coefficient for the belief in the product term model; a signifies coefficient was significant in unweighted analysis, $p < .05$, but not the weighted analysis.

Table 5

Structural Coefficients Predicting Sexual Behavior from Sexual Behavioral Beliefs

	Total	Females	Males	White	Black	Asian	Latino
Friends would respect me more	1.10* (1.05)	1.25*	1.01* (1.08)	1.07* (1.09)	1.04	1.27$_a$	1.17
Partner would lose respect for me	.80*	.80*	.80*	.75*	.83*	.90	.90$_a$
Would feel guilty	.75*	.77*	.75*	.72*	.82*	.34* (1.33)	.88$_a$
Would upset my mother	.88*	.85*	.89*	.84*	.99	1.02	.92
Would give me great deal of physical pleasure	1.19*	1.23*	1.14*	1.19*	1.10$_a$	1.44*	1.80* (.84)
Would be relaxing	1.20*	1.29*	1.13*	1.23*	1.11$_a$	1.79*	1.12
Would make me more attractive to boys/girls	1.10*	1.11*	1.10$_a$	1.06	1.09	1.42	1.17
Would feel less lonely	1.00$_a$	1.00$_a$	1.00	1.00$_a$	.95	.87	1.08
If got pregnant, would embarrass family	1.01* (.95)	.93$_a$	.92$_a$	.91$_a$	.93	.95	.91
If got pregnant, would be embarrassing for me	.91*	.89*	.93$_a$	.90*	.93$_a$	.93	.88
If got pregnant, would have to quit school	.93*	.87*	.98$_a$	.92*	.93	.94	.94$_a$
If got pregnant, must marry just to get married	.95$_a$	.94$_a$	.96$_a$	.97	.93	.91	.96
If got pregnant, would grow up too fast	1.02	.97	1.06	.99	1.12*	.97	.94
If got pregnant, have to decide about abortion	1.05	1.03	1.07	1.02	1.08	.96	1.30* (.92)

Notes: All analyses included age, parental income, maternal education and virgin status as covariates. For the gender models, ethnicity was also included as a covariate; for the ethnicity models, gender was also included as a covariate; Values are exponents of logistic coefficients; * signifies coefficient was significant, $p < .05$; if there is an accompanying number in parentheses, this means interaction with religious service attendance was significant, $p < 0.05$ and value in parentheses is the exponent of the product term coefficient and other term is exponent of coefficient for the belief in the product term model; $_a$ signifies coefficient was significant in unweighted analysis, $p < .05$ but not the weighted analysis.