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Identifying the Causal Pathways from Religiosity to Delayed Adolescent Sexual Behavior

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Abstract

This study used the Integrative Model as a framework to examine whether religiosity delays onset of coitus among a longitudinal sample of virgins, and investigated the causal pathways of this relationship. In addition, this study examined the behavioral beliefs about the consequences of engaging in sex, which distinguishes between youth who vary in level of religiosity. A further analysis was also conducted to examine whether religiosity offers protective effects in terms of progression toward sexual intercourse on a sexual behavior index. The sexual behavior index assumes a progressive nature of sexual behaviors, and includes the following seven behaviors: kissing, having breasts touched (touching for boys), genital touching, receiving oral sex, vaginal intercourse, giving oral sex, and receiving (or giving) anal sex. Religiosity at baseline was negatively associated with sexual debut one year later. This relationship was mediated through attitudes toward personally engaging in sexual intercourse. Religiosity at baseline was also negatively associated with scores on the sexual behavior index one year later. These results suggest that religiosity offers protective effects for both coital and noncoital sexual behaviors.

The Centers for Disease Control and Prevention (2006) recommends routine HIV testing for adolescents aged 13 to 19. This recommendation reflects a concern for the nations' youth, many of whom are at risk of HIV and other sexually transmitted diseases (STDs), which can often have lifelong consequences. In 2000, adolescents and young adults (ages 15–24) represented 25% of the sexually experienced population, but accounted for 48% of the 18.9 million new STD cases in the United States (Weinstock, Berman, & Cates, 2004). Furthermore, unintended teen pregnancy has been associated with other negative outcomes

for both mother and child, such as poor health, failure to complete school, and increased likelihood for teen parenthood (Kirby, 2001). Although sexual behavior among youth is a natural part of the maturation process, early sexual debut has been associated with STD transmission and unintended pregnancy (Kirby, 2001). It is often assumed that if debut of sexual intercourse can be delayed until adolescents are emotionally and cognitively equipped to handle the potentially complex decision and negotiation processes involved with engaging in safer sexual behaviors or the consequences of risky sexual behavior, many adverse outcomes of sexual behavior may be avoided. Although some past research has failed to find positive effects over time for abstinence interventions that focus on delay of sex (e.g., Jemmott, Jemmott, & Fong, 1998; Kirby, Korpi, Barth, & Cagampang, 1997), other research has provided support for the efficacy of abstinence interventions and abstinence plus interventions that focus on delay of sex and safer sex behaviors among youth (Jemmott, Jemmott, & Fong, 2010; Stanton et al., 1998). Certainly, abstinence interventions are not the only method for protecting youth from adverse consequences of risky sexual behavior, but delay of coitus presents a viable avenue among or in addition to alternatives, such as safer sex interventions. Evidence also suggests that certain individual characteristics may have protective effects against the onset of sexual behaviors (Kirby, 1999).

This article examines *whether* and *how* religiosity has protective effects in terms of delaying sexual debut. Because much of the evidence in support of this relationship is cross-sectional in nature, some scholars conclude that evidence supporting the relationship between adolescent religiosity and delay of sexual debut is “primarily correlational, cross-sectional, and atheoretical” (Rostosky, Wilcox, Comer Wright, & Randall, 2004, p. 678). However, Rostosky et al. conducted a review of the literature through 2001 and identified 10 longitudinal studies examining the relationship. They concluded that there is evidence that religiosity delays coital debut for females, but the results were less consistent for males. These findings were generally consistent across Black and White youth. More recently, Hardy and Raffaelli (2003) found a negative relationship between religiosity at Time 1 and coital debut one year later among a sample of Black, Hispanic, and White adolescents, ages 15 to 16. Gender and Race $\times$ Religiosity interactions were not significant. Thus, there is a body of evidence (cross-sectional and longitudinal) that suggests that there is a negative relationship between sexual debut and religiosity. Furthermore, the relationship is somewhat consistent across racial and gender groups.

To identify the causal pathways, Meier (2003) used longitudinal data to examine the relationship between adolescent sexual debut, religiosity, and attitudes toward sexual intercourse and demonstrated that attitudes mediated the protective effects of religiosity. Similarly, Regnerus, Rostosky, and Comer Wright (2003) showed that for a nationally representative sample of adolescents, religiosity had both direct and indirect effects on sexual debut using longitudinal data. Their study demonstrated that religiosity was partially mediated through behavioral beliefs regarding negative emotional consequences of engaging in sexual intercourse.

Evidence for partial mediation of the effects of religiosity in previous research (Holbert & Stephenson, 2003; Meier, 2003; Rostosky et al. 2004) implies that other variables may offer

explanatory power with regards to the mechanisms by which religiosity delays sexual debut. Rostosky et al. (2004) argued for multiple routes by which religion may influence sexual behaviors, including via social control mechanisms, such as normative pressure and self-efficacy (SE).

In summary, evidence suggests that the majority of youth consider religion very or fairly important in their lives (Rostosky et al., 2004). Identification of the mechanisms by which religiosity may delay sexual behavior provides insight into potentially viable opportunities for mass-mediated communication interventions. Snyder and Hamilton (2002) demonstrated that health communication campaigns can have effects on behavior using meta-analytic data. A theoretical foundation around which to develop communication messages is a principle to effective campaign design (Noar, 2006). Using longitudinal data, this study investigated the theoretical mechanism of the relationship between religiosity and sexual debut.

Theoretical Perspective

This study is guided by the Integrative Model (IM) of Behavioral Change and Prediction (Ajzen & Albarracín, 2007; Fishbein & Ajzen, 2010), which argues that the likelihood of performing a particular behavior is a function of the intention to perform the behavior, the extent to which the actor believes that he or she has the necessary skills and abilities to perform the behavior, and the sense that environmental constraints are not excessive. Intention to perform a behavior is determined by attitudes toward personally performing the behavior, perceptions of normative pressure regarding the behavior, and perceptions of behavioral control or SE with respect to performing the behavior (Ajzen & Albarracín, 2007; Fishbein & Ajzen, 2010). As Fishbein and Ajzen (2010) noted, the relative strength of attitudes, perceived normative pressures, and SE perceptions are dependent on the population and behavior under investigation (see also Smith-McLallen & Fishbein, 2009).

In turn, attitudes, perceived normative pressures, and SE are determined by underlying beliefs. Attitudes, normative perceptions, and SE perceptions represent the aggregate of beliefs regarding the behavior. From this theoretical perspective, attitudes are a function of beliefs about the outcomes of behavioral performance, weighted by the evaluation of those outcomes as positive or negative. Normative perceptions are a function of the extent to which individuals believe that particular normative referents endorse the behavior, and the individuals' motivation to comply with those referents. Normative perceptions are also a function of beliefs regarding whether particular referents actually perform the particular behavior. SE perceptions are a function of the extent to which individuals believe they can perform the behavior in the face of specific barriers.

Other variables such as religiosity, gender, and age are considered background or precursor variables that affect behavior insofar as they influence the extent to which particular beliefs are endorsed. The effects of such background variables on intentions should be completely mediated by attitudes, perceived normative pressures, and SE (Hennessy et al., 2010). Thus, an examination of the route by which religiosity delays sexual debut will inform practitioners about which sets of beliefs to target in the construction of messages promoting

sexual abstinence among youth (Fishbein & Yzer, 2003). Figure 1 provides a generic model illustrating the relationships between model components.

Hypotheses and Research Question

Given that previous research has demonstrated a negative relationship between religion and sexual debut, H1 is that religiosity (at Time 1 of data collection) is negatively associated with sexual debut between Times 1 and 2 (one year later). If a negative association between religiosity and sexual debut is established, it could be for a variety of reasons. Therefore, the second aim of this study was to examine the mechanisms by which religiosity delays coital debut. As noted, previous research has provided support for the partial mediating role of religion and intentions by attitudes. It is plausible that religiosity is also mediated through normative perceptions and perceptions of control. Previous research has provided strong support for the IM and similar models (Ajzen, 1991; Bandura, 1986; Fishbein & Ajzen, 1975; Janz & Becker, 1984; Jemmott et al., 1998; Rosenstock, 1974) with respect to sexual behaviors (Kasprzyk, Montano, & Fishbein, 1998). Thus, H2 is that attitudes, perceived normative pressures, or SE will mediate the relationship between religiosity and sexual debut.

Although sexual experimentation is a normal part of adolescent development, evidence suggests that adolescents who consider themselves virgins participate in other risky sexual behaviors (Feldman et al., 1997). If religiosity offers protective effects in terms of onset of coitus, it is plausible that it inhibits or delays other types of sexual behaviors. Although the literature regarding the relationship between religiosity and sexual behavior is largely focused on coital debut, similar negative relationships have been demonstrated for outcomes such as frequency of intercourse and number of sexual partners (e.g., Thornton & Camburn, 1987; Vesely et al., 2004).

This dataset provides a measure of sexual behavior, which represents the progressive nature of sexual activity. It is, therefore, possible to examine whether religiosity influences performance of both coital and noncoital sexual behaviors. The sexual behavior index allows for examination of the extent to which religiosity delays progression up the sexual behavior index from Time 1 to Time 2. The availability of this sexual behavior index leads to the following research question: Does religiosity delay youths progressing toward sexual intercourse on the sexual behavior index?

Data and Methods

The data for this study are from the Annenberg Sex and Media Study, a multiyear investigation of the relationship between exposure to sex in the media and self-reported sexual behavior in adolescents. The Annenberg Sex and Media Study includes a longitudinal survey of youth 14 to 16 years of age at recruitment. Participants were recruited from a major Northeastern city using direct mail, print and radio advertisements, and word of mouth. Among other things, it assesses psychosocial determinants of the adolescents' intentions to engage in (or abstain from) sexual intercourse.

Data collection was conducted using a Web-based survey that was administered in 2005 (Time 1), 2006 (Time 2), and 2007. The survey was accessible from any computer with Internet access, and participants were given the option of taking the survey at the university or at an off-site location (e.g., home, school, or community library). Most participants (84.9%) chose to take the survey at home or another off-site location. Respondents were compensated \$25 upon completion of each wave of the survey, which took an average of one hour to complete. An additional \$25 was paid to those who completed all waves of data collection. A total of 547 adolescents completed the survey at Time 1, with 501 participants completing the survey at Time 2 (92%). Only those respondents who were virgins at Time 1 were included in further analyses ($N=369$; see Hennessy, Bleakley, Fishbein, & Jordan [2008] for a detailed description of data collection). A small number of youth who were virgins at Time 1 failed to respond to the survey at Time 2 ($n=19$; 5% of Time-1 virgins). Those cases were treated as missing data. This study utilized data from Times 1 and 2.

Measures

The dependent variable was sexual debut: initiation of vaginal sex between the two rounds of data collection. Sexual debut was assessed at Time 2 using one dichotomous item: "Have you ever had sex (i.e., penis in the vagina) with a partner?" Seventy-six youth began engaging in sexual intercourse between Times 1 and 2.

We developed and validated a sexual behavior index using difficulty-ordering logic for lifetime performance of seven behaviors (Hennessy, Bleakley, Fishbein, & Jordan, et al., 2008; Ringdal et al., 1999). Sexual behaviors were ordered from least to most difficult into a progression of sexual activity: The order was deep kissing, having breasts touched or touching a female partner's breasts, genital touching, receiving oral sex, vaginal intercourse, giving oral sex, and receiving or giving anal sex (Loevinger's $H=.69$ for males and $.81$ for females). A score of 0 indicates that the adolescent did not engage in any of the sexual behaviors. A score of 7 suggests having engaged in all of the sexual behaviors listed earlier. A score of 3 indicates having engaged in kissing and breast and genital touching—the three easiest (or most frequently performed) behaviors. In Year 2, the sexual behavior index ($M=2.56$, $SD=2.08$) indicated that most youth who were virgins in Year 1 had kissed and touched a partner's breasts or had their breasts touched. The sexual behavior index has demonstrated positive associations with age, physical development, having a romantic partner, and sensation-seeking among adolescents (Hennessy et al., 2008).

Religiosity—Measures of religiosity vary. Although some researchers use denominational categories (Ku, Sonenstein, & Pleck, 1992), others use frequency of church attendance (Mott, Fondell, Hu, Kowaleski-Jones, & Menaghan, 1996; Thornton & Camburn, 1987), the importance of religion in one's daily life (Resnick et al., 1997), frequency of prayer, religious feelings (Lammers, Ireland, Resnick, & Blum, 2000), and various composite measures (Hardy & Raffaelli, 2003; Meier, 2003). The protective effects of religiosity have been demonstrated using a variety of measures and among various ethnic groups, including Black and White youth (Hubbard-McRee, Wingood, DiClemente, Davies, & Harrington, 2003; Rostosky et al., 2004). In a cross-sectional analysis, Vesely et al. (2004) demonstrated

that youth who spent relatively more time on religious activities were less likely to have initiated sexual intercourse than youth who did not.

We expected that religious beliefs can have a powerful influence on behavior in ways that are multidimensional, through the promotion of particular behavioral beliefs, normative perceptions, and perceptions of SE. These beliefs and perceptions are often communicated through social interaction among members of a religious community. Previous researchers have defined religiosity as “society-based beliefs and practices relating to God or a higher power commonly associated with a church organized group” (Egbert, Mickley, & Coeling, 2004, p. 8). We argue that it is likely that youth who are more religious engage in a variety of activities (i.e., pray, engage in extracurricular activities, and attend services) to a greater extent than youth who are less religious. Our measure of religiosity assesses the extent to which youth attend religious services, assuming that, generally, youth who have a stronger attachment to religious doctrine attend religious services to a greater extent than youth who may be considered less religious. We recognize that, like all measures, our measure of religiosity contains some error. We argue that engagement with a religious community is often at the core of religious experience (Egbert et al., 2004), and we use attendance at religious services as a measure of that experience. Although many scales and items have been utilized to assess religiosity, there is no consensus regarding the best measure of the construct. In this study, as in others (Thornton & Camburn, 1987; Vesely et al., 2004), attendance at religious services was used to assess religiosity. Religiosity was measured using the following item: “How often do you attend religious services?” Answer options included 1 (*never*), 2 (*occasionally*), and 3 (*regularly*) ($M = 2.08$, $SD = 0.74$).

The *behavioral intention* scale was created by taking the mean of the three items: “I am willing/I will/I intend to have sexual intercourse in the next 12 months.” The alpha for these measures was high (Time 1: $\alpha = .89$; $M = 2.46$, $SD = 1.90$). These items were coded from 1 (*unlikely*) to 7 (*likely*).

Attitudes were measured with the following semantic differential items: “Having sex would be...” (bad/good, foolish/wise, unpleasant/pleasant, not enjoyable/ enjoyable, or harmful/beneficial), using seven-point scales. These items were averaged to create an attitude scale, which yielded an acceptable alpha (Time 1: $\alpha = .89$; $M = 2.46$, $SD = 1.94$).

Perceived normative pressure was the mean of two seven-point scales: “Most people who are important to me think I definitely should not/definitely should have sexual intercourse in the next 12 months” (Time 1: $M = 2.40$, $SD = 1.78$), and “Most people like me will not/will have sexual intercourse in the next 12 months” (Time 1: $M = 3.62$, $SD = 2.18$). These items, an injunctive norm and a descriptive norm, respectively, were moderately correlated ($r = .49$; $M = 3.02$, $SD = 1.71$).

SE was also assessed using a seven-point scale: “If I really wanted to, I am certain that I could not/could have sexual intercourse in the next 12 months” (Time 1: $M = 4.18$, $SD = 2.40$).

Beliefs—To better understand the ways in which religiosity may influence sexual behavior, we assessed participants' behavioral, normative, and SE beliefs regarding sexual intercourse. These beliefs were chosen based on formative research (the full list can be found in Table 1). Respondents rated each behavioral belief on a seven-point scale, ranging from 1 (*extremely unlikely*) to 7 (*extremely likely*). Behavioral beliefs included the following: "If I have sexual intercourse in the next 12 months, it would make me feel that someone had taken advantage of me/make me feel good about myself/give me HIV/AIDS." Similarly, normative beliefs were rated on a seven-point scale, ranging from 1 (*should not*) to 7 (*should*), and asked participants to indicate "whether the people listed think you should or should not have sex." Referents included parents, friends, and siblings. Participants were also asked whether specific referents have ever had sexual intercourse, ranging from 1 (*none*), 2 (*a few*), 3 (*about half*), 4 (*most*), to 5 (*all*). These referents included male and female friends and male and female peers. A complete list of behavioral and normative beliefs is provided in Table 1. SE beliefs were also rated on a seven-point scale, and assessed whether "My having sexual intercourse in the next 12 months is up to me/not up to me."

Background variables—In addition to age, gender, and ethnicity, we also controlled for sensation-seeking and socioeconomic status because of their known relationships to sexual behavior (Donohew et al., 2000; Santelli, Lowry, Brener, & Robin, 2000). *Sensation-seeking* was measured using four items from the Brief Sensation-Seeking Scale (Stephenson, Hoyle, Palmgreen, & Slater, 2003; Time 1: $\alpha = .75$; $M = 3.63$, $SD = 0.85$), which were also used by Hornik, Jacobsohn, Orwin, Piesse, and Kalton (2008).

Socioeconomic status at Wave 1 was assessed using three measures: perceived neighborhood quality, mother's education, and participation in a free lunch program. These measures have been validated elsewhere (the latter two among adolescents; Echeverria, Diez-Roux, & Link, 2004; Ensminger et al., 2000). *Mother's education* was a dichotomous item representing completion of a college degree (37% graduated from college). The *perceived neighborhood quality scale* ($\alpha = .80$; $M = 3.04$, $SD = 0.78$) was comprised of three items: "Overall, how would you rate your neighborhood as a place to live?," rated on a four-point scale ranging from 1 (*poor*) to 4 (*excellent*); "How do you think your neighborhood compares to other neighborhoods in the area?," rated on a four-point scale ranging from 1 (*much worse*) to 4 (*much better*); and "How safe from crime do you consider your neighborhood to be?," rated on a four-point scale ranging from 1 (*not at all safe*) to 4 (*extremely safe*). Participation in a *free or reduced lunch program* was measured using one item: "Do you get a free or reduced-price school lunch or breakfast?" This measure was dichotomized, and respondents who chose "not sure" and "don't want to answer" were coded as missing. A total of 79 adolescents participated in a free lunch program.

Analyses

The analysis consisted of two approaches: examining the protective effects of religiosity on sexual debut and sexual progression. In the first set of analyses, we used our sample of Time-1 virgins to examine the relationship between Time-1 religious attendance and Time-2 self-reported sexual debut. Hennessy et al. (2010) and Bryan, Schmiege, and Broadus

(2006) demonstrated that structural equation modeling (SEM) is the most appropriate method for analyzing the mediating role of the IM determinants of behavior and intention (attitudes, normative perceptions, and SE). In addition, note that the IM does not specify the causal order of the mediators—that is, nowhere in the IM is there an explicit theory about the causal ordering of the measures of attitude, normative pressure, and SE. Thus, an appropriate SEM approach is to estimate the correlations between the error terms of the direct measures (Preacher & Hayes, 2008, pp. 882–883). This penalizes the SEM model in terms of R^2 for the mediating IM direct measures because correlated error terms do not contribute to R^2 . However, correlated errors do not reduce model fit because recursive causal paths between variables and correlated errors between the same variables are “equivalent models” (MacCallum, Wegener, Uchino, and Fabrigar, 1993).

The *Mplus* program was utilized to conduct path analyses because the dependent variable, coital debut, is dichotomous. When Mplus encounters ordinal indicators, it implements a weighted mean and variance estimator that has been shown to have excellent statistical qualities, even with small samples (Flora & Curran, 2004). The estimator assumes a probit (i.e., z score) metric on the unobserved latent variables. Standardized regression coefficients are reported for continuous variables, and partially standardized regression coefficients are reported for dummy variable predictors (e.g., age, race, or mother’s education). The coefficients predicting coital debut should be interpreted in terms of a z score metric (see Figure 2 for the generic SEM model).

Whereas the first set of analyses are designed to examine the relationship between religiosity and sexual debut, the second set of analyses are concerned with the relationship between religiosity and sexual *progression*. The second set of analyses looked at the relationship between religious attendance at Time 1 and the sexual behavior index at Time 2. The analyses examining the sexual behavior index as the outcome did not utilize the IM as a guiding framework due to the lack of correspondence in the measures in terms of the action under consideration (see Ajzen & Albarracín, 2007). The sexual behavior score change variable is a composite of seven outcome behaviors (e.g., kissing and touching). The IM variables used in the sexual debut analysis assess the model constructs with reference to “sexual intercourse.” Fishbein and Yzer (2003) argued that the model is useful for prediction and explanation of behaviors that are specifically defined in terms of target, action, context, and time using measures of IM constructs, which are in correspondence on these dimensions. The behavioral index is comprised of multiple specific behaviors. Therefore, the model was not utilized to predict the composite behavioral index because of the lack of correspondence between the measures of intervening variables represented in the IM and the behavioral index under consideration.

These analyses used ordinary least squares regression because the dependent variable was continuous. The average for the sexual behavior index at Time 2 ($M = 2.79$, $SD = 2.08$) was significantly higher than at Time 1 ($M = 1.75$, $SD = 1.64$), $F(7, 321) = 65.57$, $p < .001$. Time-2 scores for the sexual behavior index were regressed on Time-1 religious attendance dummy variables and control variables, such as age, gender, race, socioeconomic status¹, sensation-seeking, and Time-1 sexual behavior.

Results

Sample Characteristics

The final sample for the analyses involving sexual debut was comprised of 369 adolescents who were virgins at Time 1. At Time 2, 13% of Time-1 virgins had initiated sexual intercourse ($n=76$). At Time 1, the sample was 60.7% female, 50.6% White, 34.96% Black, 11.11% Hispanic, and 2.98% “other”; and was comprised of adolescents aged 14, 15, and 16 (39%, 31.43%, & 29.54%, respectively). The sample of Time-1 virgins consisted of significantly more White adolescents than the full Time-1 sample (difference between proportions $=-.18$; $z=-5.45$, $p<.01$). No other significant differences between the initial sample and the final sample (which was restricted to virgins) were detected with regard to demographic variables or the measure of religiosity.

Table 2 presents zero-order correlations between sexual debut, religious attendance, attitude, perceived normative pressure, and SE. Bivariate analyses demonstrated that religious attendance at Time 1 was negatively associated with sexual debut between Times 1 and 2 ($r=-.12$, $p<.05$). This finding provides support for H1.

To determine whether the protective effects of religiosity are mediated through attitudes, perceived normative pressures, and perceptions of control, a path analysis was conducted (see Figure 2). The path model in which religiosity is indirectly linked to sexual debut through intentions and the proximal determinants was a reasonably good fit. We also tested a model in which a path from religiosity directly to behavior was added. This model did not result in improved fit. Indeed, the model fit statistics either did not change (e.g., root mean square error of approximation) or changed only marginally (e.g., comparative fit index). Thus, we proceeded with the more parsimonious model, which demonstrates that the negative relationship between religiosity and onset of coitus is mediated through the determinants of intentions. Table 3 provides the coefficients for the path analysis.

As can be seen in Table 3, religiosity was entered along with background variables as precursors to the model mediators. In turn, attitudes, normative perceptions, and SE perceptions predict intentions. First, as the IM predicts, intentions are positively associated with subsequent behaviors ($\beta=.36$; see Table 3). Of the three proximal determinants of intentions, attitudes ($\beta=.83$) and normative pressures ($\beta=.83$) were significantly associated. Ajzen and Albarracín (2007) argued that the extent to which particular attitudes, normative perceptions, and SE perceptions influence intentions is a function of both the behavior and the population under consideration. For these youth, attitudes were the primary predictor of intentions to engage in sexual intercourse, followed by normative perceptions. SE perceptions were not influential in terms of predicting intentions. This finding provides partial support for H2.

Religiosity was negatively associated with all three theoretical determinants. However, the negative influence of religiosity on sexual behavior works through religiosity’s negative

¹Participation in a free lunch program was excluded from these analyses because it was nonsignificant in previous analyses, as well as in this analysis.

association with attitudes and normative pressures. In other words, whereas religiosity influences all three proximal determinants of intention, only attitudes and norms are significantly associated with intentions. Therefore, it is through those arms of the model that religiosity exerts its protective influence on coital debut. These results provide support for both H1 and H2.

Closer examination of the attitudinal and normative beliefs regarding sexual intercourse held by youth demonstrated significant mean differences by levels of religiosity (see Table 1). Each of the beliefs in Table 1 is associated with intentions ($p < .001$). When examined in this way, it becomes clear that the significant differences in the extent to which particular attitudinal beliefs are endorsed are the result of at least occasional attendance at religious services. With the exception of a few behavioral beliefs, those who attended religious services at least occasionally indicated that they believed that good things were less likely to happen and bad things were more likely to happen if they had sex than their never-attending counterparts. For example, youth who attended at least occasionally believed that intercourse would result in HIV transmission to a greater extent than youth who never attended. Similarly, regularly attending youth were more likely than occasionally attending youth to endorse that belief. Occasional and regular attendees believed that having sex would increase the quality of the relationship to a lesser extent than those who never attend. Alternatively, all religious categories of youth strongly believed that engaging in intercourse would make their parents mad and that it would please their partner. No differences were detected between levels of religiosity with reference to the beliefs that engaging in intercourse would hurt the relationship or that engaging in intercourse would increase feelings of intimacy between partners. Religiosity also did not influence the extent to which youth believed that having sex would gain them the respect of their friends. In terms of normative beliefs, the differences in the extent to which youth differed in their endorsement of specific beliefs was primarily with reference to friends, best friends, and siblings. Youth who never attended religious services believed to a greater extent that their friends and best friends think they should have sexual intercourse than their occasionally attending counterparts. In terms of sibling referents, youth who never attended religious services more strongly endorsed the belief that their brothers and sisters want them to engage in sexual intercourse. No differences in belief endorsement were demonstrated between levels of service attendance for descriptive normative beliefs.

We next examined the relationship between religiosity and youths' progression up the sexual behavior index from Time 1 to Time 2. Table 4 provides results from the regression predicting the sexual behavior index score at Time 2. Never attending religious services was associated with an increase on the Time-2 sexual behavior index, relative to adolescents who regularly attend services ($\beta = .20, p < .01$). Occasionally attending religious services was also significantly associated with the sexual behavior index score, relative to regular attendees ($\beta = .09, p < .05$). When controlling for several demographic variables, "occasional" attendees were likely to progress further up the sexual behavior index than their regularly attending counterparts ($\beta = .08, p < .05$). Similarly, youth who never attended religious services were likely to score higher on the sexual behavior index at Time 2, compared to those who regularly attended ($\beta = .09, p < .05$).

Discussion

Smith-McLallen and Fishbein (2009) and Fishbein and Ajzen (2010) argued that the extent to which the IM constructs contribute to the prediction of behavior is a function of both the behavior and the population under investigation. Our analyses demonstrated that for a sample of youth, religiosity is negatively associated with sexual debut. The results of these analyses indicate that the IM is an appropriate model for describing the relationship between religious attendance at Time 1 and delay in sexual debut one year later. Consistent with IM predictions, not intending to engage in sexual intercourse “in the next 12 months” at Time 1 of data collection was a significant predictor of refraining from sexual debut 12 months later. Religiosity did not contribute to the prediction of behavior above the predictive power of intentions. Instead, the influence of attendance at religious services worked through intentions. Similarly, religiosity did not contribute to the prediction of behavioral intentions above the contribution of attitudes and normative perceptions. SE perceptions did not contribute to the prediction of behavior, either independently or through behavioral intention.

A closer examination of the attitudinal beliefs revealed that the differences in attitudes, which drive the protective effects of religiosity, can be seen between those who attend religious services at least occasionally and those who never attend. For many of the relevant beliefs, those who regularly attend do not differ significantly from those who occasionally attend. Thus, it seems that attending religious services at least occasionally may provide benefits in terms of refraining from engaging in sexual behavior. This implies that a potentially fruitful route to intervention would be to focus abstinence-related intervention messages on the attitudinal beliefs of youth who never attend religious services and attempt to bring them closer in line with the attitudinal beliefs of those who regularly attend services. Our analyses indicate that it may be the case that exposure to religious doctrine influences the endorsement of particular attitudinal and normative beliefs.

Youth who occasionally and regularly attended religious services differed from those who never attended services on several belief items, which seem amenable to intervention, such as the belief that engaging in sexual intercourse will “make me feel good about myself” and “increase the quality of the relationship.” It is plausible that a mass-mediated intervention could target these kinds of beliefs. Although it may be the case for some youth that these beliefs are accurate reflections of reality, for many youth engaging in sexual activity, it may not result in these positive consequences or may subsequently result in negative consequences that overshadow these potential positive outcomes (e.g., STD transmission). Indeed, a longitudinal study found no change in self-esteem among boys or girls over a two-year period following onset of coitus (Spencer, Zimet, Aalsma, & Orr, 2002). For many youth, these perceptions may be unrealistic expectations. These data suggest that messages which promote abstention from or delay of sex should focus on beliefs (which may not be accurate reflections of reality), such as the belief that engaging in sex would make youth “feel good about themselves” and “increase the quality of the relationship.” For example, messages may argue that by delaying coitus, youth increase likelihood that sex will make them feel good about themselves because they will be better equipped to engage in behaviors that result in healthy sexual relationships (e.g., negotiation), rather than unhealthy

sexual relationships. Alternatively, messages might argue that, although early sexual debut may not necessarily reduce the extent to which engaging in intercourse results in these particular outcomes, it enhances the likelihood of negative outcomes, which may negate or reduce to the value of particular positive outcomes. Similarly, mass-mediated interventions could also focus on altering actual and perceived norms around sexual intercourse among those who never attend religious services.

This study also adds to the current body of research regarding the protective effects of religiosity by using a sexual risk behavior scale, which captures the progressive nature of sexual behavior. Religious attendance at Time 1 demonstrated protective effects against progression toward sexual intercourse on the sexual behavior index at Time 2. The unstandardized coefficient for adolescents who never attended religious service is equivalent to almost one half of a unit increase on the sexual behavior index ($b = .48, p < .01$; for occasional attendance, $b = .35, p < .05$), which could translate to substantially less risk for adolescents who regularly attend religious services, particularly at the higher ends of the scale. These effects remained significant even after controlling for sensation-seeking, previous sexual behavior, and multiple demographic variables.

Although these findings provide insight into the relationship between religiosity and adolescent sexual behavior, some limitations should be noted. For example, this study utilized a single measure to assess religiosity. It is plausible that the measures utilized do not adequately capture the complex nature of religiosity. It is likely that religiosity is a multidimensional construct that may not be entirely captured by the frequency which youth attend religious services. Attendance at religious services may represent a host of social influences, such as parental pressure to engage with a particular religious community and social pressure to adhere to religious doctrine. However, this study did not attempt to understand the social and psychological factors that drive youth to attend religious services but, rather, the potential effects of engagement with a religious community on sexual behaviors among adolescents. In this study, attendance at religious services was used to represent religiosity, which may represent adherence to social norms and parental pressure in addition to deeply held beliefs about a higher power. However, using this measure of religiosity, we found effects on behavior that are consistent with previous research.

Conclusion

This study utilized a commonly applied theoretical framework, the IM, to examine the influence of religiosity on sexual behaviors among a sample of adolescents, using longitudinal data. These findings are consistent with previous research insofar as they demonstrate the protective effects of religiosity (Meier, 2003; Rostosky et al., 2004) and add to the body of literature by demonstrating the causal pathways that lead to these effects. In addition to examining the relationship between coital debut and religiosity, this study provides preliminary evidence for the protective effects of religious attendance and future sexual behaviors.

Practitioners should utilize analyses such as these to guide the design of intervention messages so that the messages target the most appropriate psychosocial determinants of risk

behaviors. This analysis demonstrated that, although gender (being male), age (being older), and sensation-seeking are strong positive determinants of coital debut among these youth, religiosity can be an important factor in delay of coitus. This research informs practitioners that attitudinal beliefs distinguish between youth who attend religious services and those who never attend. We further explored whether religiosity offers protection for youth to the extent that it leads to delayed sexual progression. Promotion of those beliefs (where appropriate) could result in delayed sexual behavior among youth who never attend religious services.

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Figure 1.
A generic model of the Integrative Model.

Figure 2.

Generic path model of the relationship between religiosity and coital debut. *Note.*

Exogenous variable correlations, correlations between error terms of mediating Integrative Model variables, and endogenous variable error terms have been excluded for clarity. SES =socioeconomic status.

Table 1

Group Means and Standard Deviations of Attitudinal Measures by Religiosity

Variable	<i>Attendance at Religious Services</i>					
	<i>Never</i>		<i>Occasionally</i>		<i>Regularly</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>n</i>
If I have sexual intercourse in the next 12 months it would....	2.39 ^a	1.85	3.20 ^a	2.11	2.88	2.21 349
Make me feel that someone had taken advantage of me						
Make me feel good about myself	3.94 ^{ab}	2.06	2.99 ^a	1.98	2.94 ^b	2.14 352
Give me HIV/AIDS	2.26 ^{ab}	1.82	3.03 ^a	2.17	3.31 ^b	2.23 348
Give me an STD	2.59 ^a	1.93	3.21	2.18	3.50 ^a	2.28 348
Hurt my relationship with my partner	2.65	1.80	3.27	2.05	3.34	2.23 346
Increase the quality of relationship	4.03 ^{ab}	1.99	3.35 ^a	2.02	3.15 ^b	2.04 347
Increase feelings of intimacy between me and my partner	5.05	2.09	4.67	2.01	4.61	2.13 337
Give me pleasure	5.23 ^a	2.13	4.47 ^a	2.29	4.20 ^a	2.32 349
Make my parents mad	5.35	2.03	5.39	2.12	5.93	1.89 352
Please my partner	5.32	1.94	4.99	2.02	5.07	2.09 344
Get me or my partner pregnant	2.41 ^a	1.80	3.09	2.18	3.30 ^a	2.30 350
Gain the respect of my friends	2.94	2.11	2.64	1.84	2.59	1.96 348
Make my friends think badly of me	2.37 ^a	1.78	2.90	2.02	3.17 ^a	2.15 349
_____ thinks you should or should not have sexual intercourse in the next 12 months?						
Mother	1.56	1.19	1.28	0.81	1.22	0.97 319
Father	1.64	1.38	1.53	1.26	1.33	1.15 274
Friend	4.23 ^a	1.28	3.30 ^a	2.12	3.44	2.14 298
Best Friend	3.91 ^{ab}	2.23	2.98 ^a	2.13	2.87 ^b	2.08 285
Partner	4.29	2.39	3.55	2.12	3.87	2.26 142
Brother	2.61 ^a	2.36	1.65 ^a	1.42	1.77	1.64 184
Sister	2.11 ^a	1.83	1.70	1.43	1.37 ^a	1.11 172
About how many _____ have ever had sexual intercourse?						
Female friends	2.25	1.07	2.28	1.01	2.23	0.96 360
Male friends	2.54	1.22	2.66	1.24	2.56	1.21 361
Females your age	2.67	0.99	2.63	1.08	2.73	1.00 360

Variable	Attendance at Religious Services							
	Never		Occasionally		Regularly		n	
	M	SD	M	SD	M	SD		
Males your age	2.75	1.11	2.85	1.21	2.94	1.11	361	

Note. Row means sharing the same superscript are significantly different. STD =sexually transmitted disease.

Table 2

Correlations for Coital Debut, Church Attendance, and Theory Constructs

Variable	Coital Debut ^a	Religiosity	Intention	Attitude	Norms
Coital debut ^a	1.00				
Religiosity	-0.12	1.00			
Intention	0.25	-0.17	1.00		
Attitudes	0.25	-0.25	0.68	1.00	
Norms	0.20	-0.18	0.58	0.64	1.00
Self-efficacy	0.17	-0.12	0.39	0.51	0.41

Note. All correlations are discernable from zero at $p < .05$. All items were measured at Time 1, except where noted.

^aTime 2.

Table 3

Regression Coefficients for the Path Analysis Predicting Time-2 Coital Debut

Variable	Attitude	Normative Pressure	Self-Efficacy	Time-1 Intention	Time-2 Sexual Behavior
Religion	-.21	-.15	-.15		
Gender	-.40	-.23	-.07		
Age (15)	.07	.05	-.02		
Age (16)	.14	.26	.09		
Race (Black)	.25	.21	.28		
Race (Hispanic)	.07	.06	.00		
Race (other)	-.04	-.00	-.05		
Sensation-seeking	.32	.23	.17		
Mother's education	.11	.14	.08		
Neighborhood quality	.00	-.16	.02		
Free lunch program	.03	-.03	-.12		
Attitude				.69	
Normative pressure				.15	
Self-efficacy				.00	
Intention					.36
<i>R</i> ²	.38	.26	.11	.62	.13

Note. N =288. Entries are standardized regression coefficients. Italicized coefficients are significant at $p < .05$; $\chi^2(16) = 26.11$, $p < .05$ (comparative fit index =0.96; root mean square error of approximation =0.05).

Table 4

Ordinary Least Squares Regression Predicting the Score on the Sexual Behavior Index at Time 2

All Time 1	Model 1	Model 2
Frequency of church attendance (never)	<i>.20</i>	<i>.10</i>
Frequency of church attendance (occasionally)	<i>.09</i>	<i>.08</i>
Sexual behavior index (Time 1)	<i>.74</i>	<i>.76</i>
Gender (female)		.02
Age (15)		.00
Age (16)		.03
Race (Black)		.05
Race (Hispanic)		-.01
Race (other)		-.04
Sensation-seeking		.03
Mother's education		.09
Neighborhood quality		.07
<i>R</i> ²	.58	.79

Note. *N* = 326. Coefficients are standardized betas. Italicized coefficients are significant at $p < .05$. Reference group for religiosity = frequent attendance.