

## Socialization and Selection in the Link between Friends' Religiosity and the Transition to Sexual Intercourse\*

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*Although much research has examined how friends influence teens' sexual behaviors, little attention has been given to the association between friends' religiosity and coital debut. This study looks at the processes that could produce this association, examining whether friends' religiosity influences the transition to sexual intercourse and whether teens sort into friendship groups on the basis of consistency between their virginity status and their friends' religious attitudes. Using two waves of data from the National Longitudinal Study of Adolescent Health, this paper finds that friends' religiosity influences respondents' coital debut even after accounting for the proportion of friends who have had sex. Likewise, teens who delay their coital debut tend to switch to more religious friends, while teens who have had their coital debut tend to switch to less religious friends. These findings add to a growing body of research on the relationship between religious contextual effects and individual behavior.*

Following several decades of increases, rates of sexual intercourse among high school students have fallen in the last 15 years. Although most teens have their coital debut before they turn 19, a substantial minority (38 percent in 2003) of 12th graders report that they have not transitioned to sexual intercourse (Centers for Disease Control and Prevention 2004). Religion is one of the most prevalent reasons teenagers give for delaying their coital debut (Moore, et al. 1998). A number of researchers have confirmed an inverse relationship between personal religiosity and coital debut (Meier 2003; Lefkowitz, et al. 2004; Rostosky, et al. 2004; Regnerus 2007). Teens who find religion important, pray, and attend church regularly are more likely to receive frequent religious messages about extra-marital sex proscriptions and have higher inhibitions about transitioning to sexual intercourse before marriage.

Although many researchers have looked at the link between personal religiosity and the transition to sexual intercourse, few scholars have examined the

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relationship between friends' religiosity and coital debut. This omission is notable given that researchers have found that friends can have a strong influence on teenagers' own attitudes and behaviors (Little and Rankin 2001; Haynie 2002; Maxwell 2002; Regnerus 2002). Likewise, a growing body of literature (Stark 1996; Scheepers, et al. 2002; Moore and Vanneman 2003; Regnerus 2004) has found that religious contexts can shape people's behaviors over and above personal religiosity.

To date the only studies to examine the influence of friends' religiosity on coital debut are Adamczyk and Felson (2006) and Mott, et al. (1996). Mott, et al. (1996) found that children who attended religious services with friends were less likely than other teens to have sex by age 14. Using network data Adamczyk and Felson (2006) found that friends' religiosity has the strongest influence on the sexual behavior of adolescents who are embedded in dense social networks, where teens' friends are also friends with one another. Both studies established the process of influence for understanding the association between friends' religiosity and the timing of coital debut. However, neither study considered whether the relationship might also result from sorting processes where teens who have had their coital debut move into less religious friendship groups and teens who remain virgins develop friendships with more religious teens.

In research on the relationship between teens' sexual behaviors and characteristics of friends, researchers typically assume that friendship group attitudes, behaviors, and beliefs influence teens' sexual behavior—that is, a socialization process (Treboux and Busch-Rossnagel 1990; DiBlasio and Benda 1994; Thornberry, et al. 1994). But, the relationship could also result from teens developing new friendships, ending prior relationships, or being rejected by their friends—that is, sorting processes. If sorting processes also contribute to the association between friends' religiosity and coital debut, then Mott, et al. (1996) and Adamczyk and Felson (2006) may have overstated the process of socialization for understanding why there is a relationship between friends' religiosity and the transition to sexual intercourse.

A lack of research attention has also been given to understanding why friends' religiosity influences the transition to sexual intercourse. Although Adamczyk and Felson (2006) found, for example, that friends' religiosity influenced coital debut, they did not look at whether this relationship might be mediated by more conservative friendship group norms about premarital sex. Unraveling the processes that produce the relationship between friends' religiosity and coital debut is important for understanding how religious contexts shape behavior, and how individual behavior in turn shapes the religiosity of friendship groups.

This paper examines the processes that shape the relationship between friends' religiosity and the transition to sexual intercourse. Using longitudinal and information from teens' egocentric friendship network, I find evidence that teens who transition to sexual intercourse tend to sort into less religious

friendship groups, while teens who remain virgins move into more religious friendship groups. Additionally, I find that regardless of personal religiosity and friends' virginity status, teens with more religious friends are less likely to transition to sexual intercourse than adolescents in more secular friendship groups, suggesting that friends' religiosity influences coital debut through processes of social control and identification with religiously inspired premarital sex proscriptions, rather than more conservative sex attitudes and limited opportunities for sex.

## INFLUENCE OF RELIGIOUS FRIENDS ON COITAL DEBUT

Much research on religiosity and coital debut has found that more religious adolescents are more likely than less religious teens to delay their transition to sexual intercourse (Thornton and Camburn 1989; Meier 2003; Rostosky, et al. 2004). All major religions proscribe premarital sex. Hence, teens who actively participate in religious activities are more likely to receive religious messages concerning premarital sex, and frequent prayer and religious involvement may signal their acceptance of the religious institution's teachings. Additionally, religious teens are more likely than secular adolescents to participate in the virginity pledge movement, which researchers have found to be effective in delaying coital debut (Bearman and Bruckner 2001).

A number of studies have also found that friends can have a powerful influence on teens' attitudes and behaviors (Little and Rankin 2001; Haynie 2002; Maxwell 2002; Adamczyk and Felson 2006). Friends help teens develop their identities, gain autonomy from their parents, and test conventional boundaries (Brown, et al. 1986; Thornberry, et al. 1994; Crosnoe 2000). Because of the developmental changes that accompany adolescence and the large amount of time teens spend with their friends, there is reason to think that their friends' religious attitudes may influence teens' transition to sexual intercourse.

Through conversations with their friends, teens become aware of their friends' attitudes about premarital sex and religion (Stark 1996; Lefkowitz, et al. 2004). Since more religious teens tend to have more conservative attitudes about premarital sex, teens who have more religious friends should get more exposure to religious precepts about premarital sex. As a result of social learning processes, teens with more religious friends should be less likely to transition to sexual intercourse than teens with less religious friends, even if they are not personally religious. In his classic work on attitude change, Kelman (1958, 2006) argues that individuals may adopt other's attitudes without accepting the rationale for the attitudes in order to maintain their sense of self. He calls this process identification. Through a process of identification, teens with more religious friends may adopt premarital sex

proscriptions, even if they are not personally religious to maintain a self-image based on reference group expectations.

Teens may also comply with majority religious beliefs and attitudes about extramarital sex because they want to be accepted by their friends. Before engaging in a sexual act, teens may consider the consequences of their friends' reactions for their self-image and group membership (Heimer and Matsueda 1994). Teens who have strong attachments to their friends will try to maintain reputations that are consistent with group attitudes (Hirschi 1969). The more negative the anticipated reaction, the lower the likelihood that teens will engage in behaviors that violate friendship group norms.

Finally, friendship group religiosity may directly affect the timing of coital debut through opportunity provision or limitation. Since sex requires a partner, activities with friends where teens meet others interested in sex may be particularly important in determining the probability of a sexual encounter. Religious friends could limit opportunities to find potential sexual partners by involving teens in conventional activities, such as religious gatherings, where pro-virginity values are promoted (Felson 2002). Since religiously sponsored activities are often structured and include adult supervision, they could also limit sex behaviors in the same way that these types of activities limit behaviors like delinquency (Osgood, et al. 1996). Additionally, these activities and groups are typically devoid of alcohol, and alcohol use can contribute to increased sexual behavior among young people (Graves and Leigh 1995).

Since more religious teens are more likely to delay their coital debut, friendship group religiosity should also be associated with a lower proportion of friends who have had sex. If teens have a high proportion of friends who are sexually active, then they will be more likely to participate with their friends in activities where they can meet potential sexual partners, and they should get more exposure to more permissive sexual attitudes. Hence, we would expect that the proportion of friends who have had their coital debut would explain the relationship between friends' religiosity and the transition to sexual intercourse.

## SELECTION, DESELECTION, AND PEER REJECTION

Although friendship groups may influence the timing of coital debut, adolescents will not always follow their attitudes and behaviors. While friends' religiosity may delay premarital sex, in many cases it does not prevent it. As teens get older, increasing numbers of them will transition to sexual intercourse. Whereas approximately 28 percent of ninth grade females and 37 percent of ninth grade males report having had their coital debut, 62 percent of 12th grade females and 60 percent of 12th grade males report having transitioned to sexual intercourse (Centers for Disease Control and Prevention 2004). Even

teens who have highly religious friends will likely transition to sexual intercourse by their late teens.

If teens do not follow friendship group religious precepts about extramarital sex, they may feel uncomfortable in their current friendship group. One way to resolve inconsistencies between their virginity status and their friendship groups' religiously inspired attitudes about premarital sex is to leave and seek out less religious friends whose perspectives and behaviors are more consistent with their new non-virgin status. Their friends may also desire more consistency between their religiously inspired attitudes and their friends' extramarital sex behaviors. If adolescents think their religion is important, they may also want friends who take their religious faith seriously, as indicated by their adherence to religious precepts about extramarital sex. As a result, when teens choose their friends, they may opt for people whose behaviors are consistent with strong religious beliefs. When teens transition into sexual intercourse, they may deselect more religious friends, develop relationships with less religious teens, or be rejected by more religious friends.

Like teens who have transitioned into sexual intercourse early, adolescents who remain virgins will eventually find themselves in the minority. Because more religious teens have their coital debut later than less religious adolescents, teens who choose to delay their coital debut will share their virginity status with adolescents who are more religious. Just as teens may sort into less religious friendship groups following the transition to sexual intercourse, teens who remain virgins may seek out or be pushed into friendship groups that are more religious, even if they are not personally religious. For teens who remain virgins, more religious friends may be more appealing than less religious ones because religious friends should have attitudes and behaviors that are more consistent with their virginity status.

Although little attention has been given to understanding how religious friends contribute to socialization and sorting (selection, deselection, and rejection) processes, social scientists (Thornberry, et al. 1994; Krohn, et al. 1996) have examined how other friendship group characteristics contribute to these processes. They typically find that both socialization and sorting are involved. These previous studies suggest that friends' religiosity should influence the transition to sexual intercourse, which would also affect teens' friendship choices. I test whether teens who transition to sexual intercourse sort into friendship groups that are less religious than their previous group, and whether teens who remain virgins sort into friendship groups that are more religious than their previous group. I also examine whether the proportion of friends who have had their coital debut explains the relationship between friends' religiosity and the transition to sexual intercourse, which would indicate that friends' religiosity influences coital debut through opportunities for sex and more permissive sex attitudes, rather than processes of social control or identification with religiously inspired premarital sex proscriptions.

## DATA AND MEASUREMENT

To test the relationship between religious friends and coital debut, I use the first two waves of the National Longitudinal Study of Adolescent Health (Add Health), designed by the Carolina Population Center.<sup>1</sup> Begun in 1995, this survey was part of a three-wave study that started when respondents were in grades 7 to 12 and ended when they were between the ages of 18 and 25. Investigators initially sampled 80 high schools from a complete database of all U.S. high schools using implicit stratification based on demographic characteristics (e.g., ethnicity, size, and degree of urbanicity). Investigators also recruited middle schools linked to selected high schools, for a total of 132 schools.

Add Health investigators randomly selected a subgroup of the original in-school sample for more extensive in-home interviews six months later. I use a subset of this in-home sample known as the "saturated sample." In this sample Add Health investigators tried to administer in-home questionnaires to all students on the school roster. As part of the questionnaire students were asked to identify up to five friends<sup>2</sup> of each sex from the school roster. With this information, I was able to link respondents to characteristics of their friends. Add Health only contains religion information on friends within a teen's high school. On average, respondents nominated a total of 5.2 people. When unidentifiable friends were eliminated the average number of nominations dropped to 4.5. Since friends who are not attending the same high school could be a potential source of influence, I include in all analyses the number of outside nominations.

Of the 3,657 respondents interviewed during Wave I (W1), Add Health investigators reinterviewed 2,647 of the respondents for Wave II (W2) interviews. Add Health investigators did not reinterview respondents who were in the 12th grade at W1 and were not part of the genetic sample at W2 or, respondents who were in the W1 disabled sample. If teens did not nominate at least one friend from their school who had religion and sex information at W1 and W2, they could not be included in the analysis, which reduced the analytic sample size to 1,677. Because this study is primarily interested in the link between friends' religiosity and the transition to sexual intercourse, if

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<sup>2</sup>Add Health investigators also asked respondents to list their last three romantic partners. If any friends were also listed as a romantic partner, I deleted them from the list of friends because counting a romantic partner as a friend could overestimate the influence of friends' religiosity on coital debut.

respondents had sexual intercourse by W1 ( $N = 548$ ), or did not answer the question about sexual intercourse ( $N = 11$ ), they were not included in the analysis. Aside from parents' income, which was imputed, all cases are listwise deleted which resulted in a loss of 40 cases, leaving a final sample size of 1,078 respondents.

Below I describe the measures used to assess selection and socialization in the relationship between friends' religiosity and coital debut. Table 1 provides information about how concepts are defined and corresponding measures calculated, and table 2 gives descriptive statistics.

### *Dependent Variables*

For assessing the influence of friends' religiosity on the transition to sexual intercourse, I use a dichotomous variable indicating whether or not a respondent who was a virgin during the first data collection transitioned to sexual intercourse by W2. About one year passed between the first two interview waves. Add Health investigators asked sensitive questions like virginity status using an audio computer-assisted interview (audio CASI) technique, which should reduce social desirability bias.

To examine sorting effects, which include selection, deselection, and rejection, I use a change score that measures the difference in friends' private religiosity between W1 and W2.<sup>3</sup> In analyses not shown here I found that friends' public religiosity (religious attendance and youth group participation) is not significantly related to coital debut when private religiosity is included as a control. I, therefore, use an index of friends' private religiosity, created by combining two questions that ask about prayer and subjective religious importance at W1 and W2. The frequency of prayer question has five categories, while religious importance has four categories. Both items were standardized before

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<sup>3</sup>There are several ways that I examine the possibility that a change in friends' religiosity is the result of compositional changes, rather than the same friends changing religious beliefs. First, I look at the stability of the respondents' friendship network during the 12-month time period between the two data collections. I found that very few friendship groups (less than 4 percent) remained completely stable over the one-year period and that for the overwhelming majority of adolescents (80 percent) only one friend remained the same over the one-year period. In addition to a high level of compositional change, these preliminary analyses show that there are not enough cases ( $N = 35$ ) to assess changes in religiosity to friendship groups that remained stable. I also look at a correlation between W1 and W2 religiosity, finding a significant and high correlation between the two religiosity measures (private = 0.74; public = -0.71) during the 12-month period, which suggests that religiosity for any particular friend changed minimally. Additionally, the mean of each friend's general religiosity measured at W1 and W2 was examined and no significant differences between them were found. Finally, the correlation between the absolute (unsigned) change in friends' religiosity and the proportion of overlap between friendship groups at W1 and W2 was examined. I found that as the proportion of overlap decreased, friends' religiosity significantly changed; confirming that any change to friendship group religiosity is likely the result of changing friends, rather than changing religiosity within the friendship group.

TABLE 1  
Description of Variables Included in the Analysis

Key Variables	Description
Coital debut between W1 and W2	Dummy variable indicating whether or not the respondent "ever had sexual intercourse? When we say sexual intercourse, we mean when a male inserts his penis into a female's vagina"
Friends' private religiosity	Mean private religiosity (frequency of prayer and subjective religious importance) of friends who were nominated by the respondent. The index has been centered and standardized
Change in friends' private religiosity	Change in mean friends' private religiosity between W1 and W2
Proportion of friends who had their coital debut	Mean proportion of friends in the group who have had their coital debut
<i>Individual religion measures</i>	
Individual private religiosity <sup>a</sup>	Mean private religiosity (frequency of prayer and subjective religious importance). The index has been centered and standardized
<i>Demographic variables</i>	
Age	Respondent's age at the time of initial survey in months
Race	Set of dummy variables. White is the reference category
Gender	Dummy variable. Female is the reference category
<i>Additional variables</i>	
Parental approval of sex	Mean value of available score on four items asked of a parent and the respondent. Items asked of the respondent for each parent: (1) how would your mother feel about you having sex at this time in your life and (2) how would she feel about you having sexual intercourse with someone you knew well and was special to you? Items asked of mother: (1) how much do you disapprove of your child having sexual intercourse at this time, and (2) if it was someone that was special and he or she knew well, you would not mind?
Parents' education	Mean of mother, father, or step-parent's education on a nine-point scale, as reported by the respondent and one parent

Continued



TABLE 1  
*Continued*

Key Variables	Description
Parents' reported income	Family income as reported by parents. Missing values were imputed on the basis of other information in the model
Living with two parents	Dummy variable indicating whether respondent lives at home with two parents
Parental closeness	Mean value of available score for five items: (1) feel close to mother, (2) feel close to father, (3) feel mother cares about you, (4) feel father cares about you, and (5) feel parents care about you?
Romantic relationship	Indicates whether the respondent in the past 18 months has had a special romantic relationship
Grades	Average of grades available in math, English, science, and history or social studies
Out-of-school nominations	Sum of instances of codes indicating out-of-school nominations

<sup>a</sup>Respondents who answered "no religion" or "don't know" to the question, "What is your religion?" were given the lowest category for the religiosity measures.

being averaged together. To make the scale intuitive, I standardized and centered the mean at zero after it was created. To calculate the change score, the W1 friends' private religiosity measure is subtracted from the W2 measure. While zero indicates no change, positive numbers suggest a change to a more religious friendship group, and negative numbers mean a change to a less religious friendship group.

### ***Key Independent Variables***

Friends' private religiosity, as measured at W1, is used to examine whether teens transitioned into sexual intercourse between W1 and W2. Like change in friends' private religiosity, friends' private religiosity is developed from questions about prayer frequency and religious importance. The two items produce an alpha of 0.886. Since the relationship between friends' religiosity and teens' sexual behaviors may be mediated by friends' sexual behaviors, I include a measure of the proportion of friends who had their coital debut. To compute this measure the total number of friends who had transitioned to sexual intercourse is divided by the total number of nominated friends.

A dummy variable indicating whether or not the respondent transitioned to sexual intercourse between W1 and W2 is used to examine change in friends' religiosity between W1 and W2.

TABLE 2  
Descriptive Statistics for Variables Included in the Analysis (N = 1,078)

Key Variables	Mean	SD	Minimum	Maximum
Had coital debut between W1 and W2	0.19	0.39	0.00	1.00
Friends' private religiosity (W1)	0.00	1.00	-3.12	1.11
Change in friends' private religiosity (W1-W2)	0.00	0.90	-4.24	3.69
Proportion of friends who had their coital debut (W1)	0.25	0.30	0.00	1.00
<i>Demographic variables (W1)</i>				
Age (months)	189.71	17.52	152.00	241.00
Hispanic	0.07	0.26	0.00	1.00
Black	0.10	0.30	0.00	1.00
Asian	0.14	0.35	0.00	1.00
Other race	0.02	0.14	0.00	1.00
Female	0.52	0.50	0.00	1.00
<i>Additional variables (W1)</i>				
Parental approval of sex	2.20	0.64	1.00	5.00
Parents' education	5.00	1.74	0.50	8.00
Parents' reported income (imputed)	44.66	27.85	0.00	280.00
Living with two parents	0.77	0.42	0.00	1.00
Parental closeness	4.72	0.44	1.67	5.00
Romantic relationship	0.41	0.49	0.00	1.00
Grades	2.93	0.74	1.00	4.00
Out nominations	1.01	1.43	0.00	9.00
Individual private religiosity	0.00	1.00	-2.40	0.81

### Control Variables

Because adolescents who have religious friends are likely to be religious themselves and individual religiosity<sup>4</sup> is related to coital debut, I control for individual religiosity. Preliminary analysis showed that individual private religiosity (prayer frequency and subjective religious importance) explained the

<sup>4</sup>Because teens who belong to more conservative denominations may have more conservative attitudes about premarital sex, I considered including respondents' denominational identity using five dummy variables: Catholic, mainline Protestant, other Protestant, other religion, and no religion, where conservative Protestant is the reference category. However, preliminary analysis showed that denominational affiliation was not significant in any of the models, and did not alter the relationship between key variables and the outcome. There is a considerable variation within these categories, and teens may not know the correct name of their denomination, which could explain why these categories do not help explain coital debut. Previous research (Regnerus 2007) using Add Health data has found that religious affiliation is less important than religiosity (e.g., religious importance, attendance) for explaining the relationship between religion and sex.

same variance in the probability of transition to sexual intercourse as individual public religiosity (religious service attendance and youth group participation).<sup>5</sup> To ascertain the contribution of the friends' religiosity measure beyond individual religiosity, I have opted to use the same two-item measure to assess respondents' private religiosity. Combined the questions that asked about religious importance and prayer frequency have an alpha of 0.853.

In addition to individual private religiosity, several important control variables are also included. Academic achievement tends to be negatively correlated with premarital sexual relations (Schvaneveldt, et al. 2001). Hence, an average of self-reported grades from four academic subjects is included. Since friends nominated outside of the school could provide additional opportunities for sex, I control for the number of out-of-school nominations. Because males tend to report more sexual activity than females, I control for gender (Eder and Enke 1991; Whitbeck, et al. 1999). Older adolescents are more likely to have transitioned to sexual intercourse than younger teens and, therefore, age is included in all models. I also examine interactions between key independent variables (friends' religiosity and coital debut between W1 and W2) and age and gender. Because adolescents in a dating relationship are more likely to have transitioned to sexual intercourse than teens without a partner, I control for dating status (Rostosky, et al. 2004). Previous research has found that age of first sexual activity (Ford and Kadushin 2002) varies by race. Hence, I include five racial/ethnic categories: black, Hispanic, Asian, white, and other.

I control for several attributes of the family: adolescents' perceived closeness to parents, parental approval of premarital sex, number of parents in the primary home, family income, and parents' education, which previous research has suggested is related to the transition to sexual intercourse (Miller and Bingham 1989; Treboux and Busch-Rossnagel 1990; DiBlasio and Benda 1994; Lammers, et al. 1999; Little and Rankin 2001). Because 22 percent of respondents were missing information on family income, I impute income on the basis of other variables in the model.

### **Methods**

To examine the effect of friends' religiosity on the transition to sexual intercourse, logistic regression is employed. Specifically, I look at the influence of friends' private religiosity measured at W1 on coital debut at W2 for adolescents who were virgins at W1. I then test whether this relationship is mediated by the proportion of friends who have transitioned to sexual intercourse.

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<sup>5</sup>When entered into a regression model together, neither individual public nor individual private religiosity was significant. When entered alone both variables were significant and significantly increased overall model fit.

The possibility of Type II error is boosted by restricting the sample to virgins at W1 (Berk 1983). One well-known way of dealing with selection bias is to employ the two-stage Heckman correction, which I considered using Winship and Mare (1992). However, Stolzenberg and Relles (1997) show that the Heckman correction can introduce high levels of multicollinearity into the regression equation, especially when the factors influencing a person's selection into the sample are the same ones that influence the dependent variable of interest. Clearly, this is the case here because the dependent variable (coital debut between W1 and W2) is the *same* as the selection equation's dependent variable (coital debut before W1). Rather than a Heckman selection model, I opted instead to limit my sample to virgins, which will eliminate some important variation in individual and friends' religiosity. Preliminary analysis showed that the respondents included in the analytic sample have higher levels of religiosity, more religious friends, and fewer friends who had their coital debut than respondents in the full saturated sample. Because variation in virginity status, and individual and friends' religiosity is reduced, the estimates of the effect of coital debut should be more conservative than they would be with the inclusion of W1 non-virgins.

For examining selection effects I employ change scores and OLS regression analysis techniques.<sup>6</sup> With the change score model, the difference between friends' religiosity at the two time points is regressed on a dummy variable coded "1" if the respondent transitioned to sexual intercourse between W1 and W2.<sup>7</sup> About a year passed between the two waves of data collection, so the models should provide conservative estimates.<sup>8</sup> The short

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<sup>6</sup>There are a couple of reasons why the change score method, rather than the regression variable method, is used. Most importantly, preliminary analysis of the data showed that results from the regressor-method contradict those based on a comparison of mean friends' religiosity at T2 between adolescents who had their coital debut and adolescents who remained virgins by T2. Allison (1999) notes that under certain conditions researchers may find such inconsistent relationships. He goes on to explain that in cases where results from the regressor-method defy common sense, which is the case with my analysis, the change-score method is superior to the regressor-variable method. Additionally, unlike coefficients in regression-variable analyses, coefficients in change-score regressions are unbiased by the absence of variables whose values and effects do not change from W1 to W2. Hence, while I include person-level characteristics, like race and gender in all models, the results should be unaffected by these variables and other unmeasured characteristics that do not change between the waves.

<sup>7</sup> $\Delta FR_{t2-t1} = B_0 + B_1(\text{Sex}) + e$ , where  $\Delta FR_{t2-t1}$  = Friends' religiosity, W2 - Friends' religiosity, W1; Sex = Dummy variable indicating respondent lost virginity between W1 and W2; and  $e$  = error.

<sup>8</sup>One problem with examining change in friends' religiosity is disentangling it from other changes that may also occur during the same period, and could be related to the outcome. During a one-year period in a teen's life, he or she could move, transition from junior to senior high school, and experience parental separation divorce, or parental marriage, all of which could influence friendship formation and dissolution. Add Health only has information on respondents who remained in the same school, and the saturated sample only includes high school students, which limits changes due to high school

TABLE 3  
Correlations between Key Variables

	Individual Private Religiosity	Friends' Private Religiosity	Change in Friends' Private Religiosity	Coital Debut
Individual private religiosity (W1)	1.00			
Friends' private religiosity (W1)	0.44*	1.00		
Change in friends' private religiosity between W1 and W2	0.04	0.45*	1.00	
Coital debut between W1 and W2	-0.14*	-0.16*	-0.10*	1.00
Proportion of friends who had their coital debut (W1)	-0.09*	-0.24*	-0.13*	0.24*

\* $p < .05$

recall window should minimize errors of memory. I follow Add Health investigators' recommendation to use the cluster command in Stata 8.2, which adjusts for the standard errors resulting from a cluster sample design.

## RESULTS

Table 3 presents correlations between key variables used in the analysis. Unsurprisingly there is a significant, positive, and moderate correlation (0.44) between individual and friends' private religiosity. A negative and smaller correlation can be found between individual private religiosity and a transition to sexual intercourse between W1 and W2 (-0.14), and individual private religiosity and the proportion of friends who had their coital debut at W1 (-0.09). The proportion of friends who have had their coital debut is also negatively correlated with a change in friends' private religiosity (-0.13) and positively correlates with the transition to sexual intercourse (0.24).

In table 4 the results for the analysis of friends' religiosity on the odds of coital debut are presented. Consistent with previous research, older respondents, teens in romantic relationships, and respondents whose parents approve

transition and residential moves outside the immediate area. Nevertheless, changes like a move within the same school district, or parents remarrying or separating could influence a teen's friendship group formation, particularly if these events impact a teen's time use, daily routine or living arrangements (McLanahan and Booth 1989).

TABLE 4  
Odds Ratios from Logistic Regression Models Predicting Transition to Sexual Intercourse between 1995 and 1996, Standard Errors of Log-Odds in Parentheses (N = 1,078)<sup>a</sup>

Key Variables	Model 1		Model 2		Model 3		Model 4	
	Ratios	SE	Ratios	SE	Ratios	SE	Ratios	SE
Individual private religiosity	1.01*	(0.01)					0.87**	(0.04)
Friends' private religiosity	0.92	(0.28)			0.88*	(0.05)	0.81**	(0.06)
Proportion of friends who had their coital debut	1.48	(0.49)	0.79**	(0.05)	0.75**	(0.05)	3.00**	(1.19)
<i>Control variables<sup>b</sup></i>								
Age	0.72†	(0.14)						
Hispanic	0.72	(0.39)	1.02†	(0.01)	1.01	(0.01)	1.01	(0.01)
Black	0.86	(0.10)	1.06	(0.33)	1.19	(0.39)	1.13	(0.37)
Other race	1.31**	(0.12)	1.72	(0.60)	1.93†	(0.67)	1.63	(0.54)
Female	0.90	(0.09)	0.83	(0.15)	0.99	(0.18)	0.92	(0.15)
Parental approval of sex	0.90	(0.10)	0.80	(0.43)	0.88	(0.49)	0.77	(0.44)
Parents' education	1.00	(0.00)	0.90	(0.13)	0.94	(0.11)	0.94	(0.13)
Household income	0.54**	(0.11)	1.25*	(0.13)	1.27*	(0.14)	1.23	(0.16)
Living with two parents	0.77†	(0.11)	0.91	(0.08)	0.92	(0.07)	0.93	(0.08)
Parental closeness	3.24**	(0.40)	1.00	(0.00)	1.00†	(0.00)	1.00	(0.00)
Romantic relationship	0.67**	(0.04)	0.57**	(0.11)	0.55**	(0.12)	0.57*	(0.13)
Grades	1.02	(0.07)	0.81	(0.12)	0.82	(0.11)	0.80	(0.12)
Out nominations	0.12	(0.07)	3.17**	(0.36)	3.18**	(0.37)	3.02**	(0.34)
Pseudo-R-squared			0.69**	(0.04)	0.70**	(0.04)	0.71**	(0.05)
Log pseudo-likelihood			1.04	(0.07)	1.04	(0.08)	1.02	(0.08)
			0.13		0.14		0.16	
			-452.77		-447.83		-440.23	

Note: An odds ratio that is less than one indicates a negative relationship and an odds ratio that is greater than one indicates a positive relationship. If the odds ratio is less than one, then the proportion decrease in the odds of having transitioned to sexual intercourse can be computed by dividing the odds ratio by the difference between the odds ratio and one. If the odds ratio is greater than one, then the proportion increase in the odds of having transitioned to sexual intercourse is the difference between the odds ratio and one.

<sup>a</sup>Sample includes only virgins at W1.  
†p < .10; \*p < .05; \*\*p < .01 (two-tailed)

of premarital sex are more likely to have transitioned to sexual intercourse between W1 and W2. Respondents living with two parents and respondents with better grades are less likely to have had their coital debut than other respondents.

The second model shows that as teens' private religiosity increases, they are less likely to have transitioned to sexual intercourse during the one-year time period. A one standard deviation increase in individual private religiosity is associated with a 27 percent decrease ( $=0.21/0.79$ ) in the odds of having a coital debut between 1995 and 1996. This finding is consistent with previous research on the relationship between religion and coital debut (Thornton and Camburn 1989; Meier 2003; Rostosky, et al. 2004). Model 3 shows that the negative effect of friends' private religiosity is significantly related to coital debut. A one standard deviation increase in friends' private religiosity is associated with a 33 percent decrease ( $=0.25/0.75$ ) in the odds of having transitioned to sexual intercourse between 1995 and 1996. To determine whether the overall model fit significantly improves when friends' private religiosity is included I use a chi-square distribution to look up the significance of the difference between Models 2 and 3. I find that friends' religiosity significantly ( $p < .005$ ) improves the overall model fit [ $9.88 = ((-452.77^* - 2) - (-447.83^* - 2))$ ]. The log-odds of other variables in Model 3 have changed little from Model 1.

Model 4 examines whether the proportion of friends who have had their coital debut mediates the relationship between friends' private religiosity and coital debut.<sup>9</sup> As the proportion of friends who have had their coital debut increases, the odds of the respondent having transitioned to sexual intercourse between W1 and W2 increases. The change in the friends' religiosity log-odds from 0.75 to 0.81 suggests that the proportion of friends who have had their coital debut may partially mediate this relationship. To test whether the change in the friends' religiosity log-odds is statistically significant, I use a formula derived by Clogg, et al. (1995). This formula calculates the standard error for the difference in estimates between full and reduced models, which can then be used in a conventional *t*-test to discern significance.<sup>10</sup> Using this technique, I find that when the proportion of friends who have had their coital debut is included the decrease in the friends' religiosity log-odds is not significant ( $p < .05$ ). Hence, the proportion of friends who have had their coital debut does not significantly mediate the relationship between friends' religiosity and the transition to sexual intercourse between W1 and W2. Even after controlling

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<sup>9</sup>I also looked at the interactions between Black and friends' religiosity, age and friends' religiosity, sex (female versus male) and friends' religiosity, personal denominational affiliation and individual private religiosity. None of these interaction terms were significant at the  $p < .10$  level.

<sup>10</sup>The formula for the *t*-test is  $(t = (b^* - b)/s(b^* - b))$ , where  $b^*$  is the beta coefficient for the reduced model;  $b$  the beta coefficient for the full model; and  $s(b^* - b)$  the standard error of the difference.

for the proportion of friends who have had their coital debut and personal religiosity, more religious friends seem to insulate teens from the transition to sexual intercourse when compared to more secular friends.

It is useful to gauge the strength of friends' private religiosity relative to the strength of other variables in the model. By multiplying log-odds by their standard deviations, the relative size of variables in Model 4 can be compared (Pampel 2000:33). The strongest effects are: romantic relationship status ( $0.54 = 0.49 \times 1.11$ ), followed by the proportion of friends who have had their coital debut ( $0.33 = 0.30 \times 1.10$ ). Friends' private religiosity ( $-0.21 = 1.00 \times -0.21$ ) is ranked ahead of individual religiosity ( $-0.13 = 1.00 \times -0.13$ ). In contrast, friends' private religiosity is ranked behind living with two parents ( $-0.24 = 0.42 \times -0.56$ ) and grades ( $-0.25 = 0.74 \times -0.34$ ).

In table 5 I examine selection effects by regressing change in friends' religiosity between 1995 and 1996 on the transition to sexual intercourse during

TABLE 5  
Unstandardized Coefficients from OLS Regression of Subsequent Friends' Religiosity  
Using Change Scores on Transition to Sexual Intercourse and Other Controls  
(Standard Errors in Parentheses, N = 1,078)

Key Variables	Model 1		Model 2	
	$\beta$	SE	$\beta$	SE
Coital debut between W1 and W2			-0.21*	(0.08)
<i>Control variables</i>				
Individual private religiosity	0.05	(0.03)	0.04	(0.03)
Age	0.00	(0.00)	0.00	(0.00)
Hispanic	0.03	(0.05)	0.03	(0.05)
Black	-0.13	(0.13)	-0.11	(0.12)
Asian	-0.01	(0.08)	-0.02	(0.08)
Other race	0.32 <sup>†</sup>	(0.15)	0.31 <sup>†</sup>	(0.15)
Female	0.03	(0.05)	0.03	(0.05)
Parental approval of sex	0.00	(0.06)	0.01	(0.07)
Parents' education	0.02	(0.02)	0.02	(0.02)
Household income	0.00	(0.00)	0.00	(0.00)
Living with two parents	-0.14	(0.08)	-0.16 <sup>†</sup>	(0.08)
Parental closeness	0.01	(0.03)	-0.00	(0.03)
Romantic relationship	-0.07	(0.06)	-0.04	(0.06)
Grades	-0.00	(0.03)	-0.01	(0.03)
Out nominations	-0.03	(0.02)	-0.02	(0.02)
Constant	-0.12	(0.57)	-0.09	(0.53)
Log-likelihood	-1,405.21		-1,401.00	
R-squared	0.01		0.02	

<sup>†</sup> $p < .10$ ; \* $p < .05$  (two-tailed)



this same period. Model 1 shows that none of the control variables are significant and the model as a whole is explaining relatively little variance. As mentioned above, the variance explained in change-score models is unaffected by many variables like gender and race, which do not change between the two waves of data collection, but typically contribute to variance in regular regression models.

In Model 2 the key independent variable, sexual transition between W1 and W2, is included in the model and it is significant and negative. Adolescents who transitioned to sexual intercourse between W1 and W2 tend to have less religious friends at W2 relative to their friends' religiosity, as measured at W1. In figure 1, I present the predicted values for the amount of change in friends' religiosity between W1 and W2 for people who transitioned to sexual intercourse between W1 and W2, and those who remained virgins during that time period. In figure 1, zero indicates no change in friends' private religiosity between 1995 and 1996. Figure 1 shows that respondents who transitioned to sexual intercourse between W1 and W2 experienced a 0.19 unit decrease in their friends' private religiosity at W2 when compared to their friends' private religiosity as measured at W1. Figure 1 also shows that respondents who remained virgins between W1 and W2 had an increase of 0.04 in their friends' private religiosity at W2 when compared to their friends' private religiosity as measured at W1. Just as teens who have transitioned to sexual intercourse sorted into less religious friendship groups, teens who remained virgins switched to more religious friends relative to their friends' religiosity one year prior.

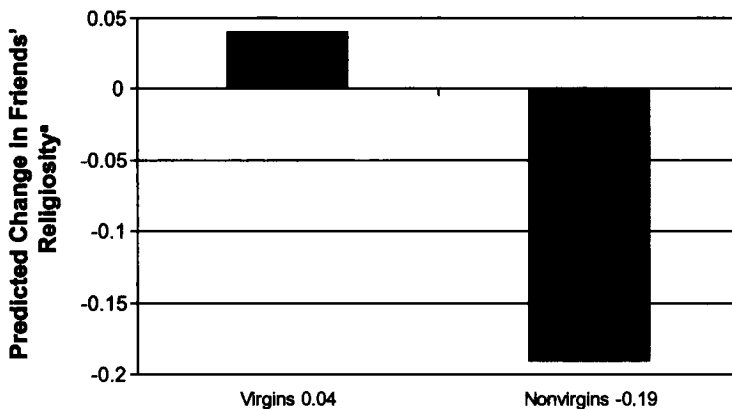


FIGURE 1

Predicted Change in Friends' Religiosity by Whether or Not Respondents Had Their Coital Debut between W1 and W2 ( $N = 1,078$ ). 0 = No change in friends' religiosity between W1 and W2.

<sup>a</sup>The predicted change in friends' religiosity over time differs significantly from 0 for both groups [ $p < .001$  (two-tailed test)]

## DISCUSSION AND CONCLUSION

A number of researchers (Treboux and Busch-Rossnagel 1990; DiBlasio and Benda 1994; Maxwell 2002) have emphasized the importance of friends for understanding teens' behaviors. My findings add to this body of work. Specifically, I found that friends' religiosity influences the transition to sexual intercourse, after accounting for personal religiosity. These findings suggest that individual and friends' religiosity affect sexual debut in different ways. Psychological inhibitions about having sex are likely influenced by private religiosity. Alternatively, friends' religiosity may influence coital debut through social control processes and identification with religiously inspired premarital sex proscriptions.

Although the proportion of friends who have transitioned to sexual intercourse is related to sexual debut, this measure did not significantly mediate the relationship between friends' religiosity and the transition to sexual intercourse. Regardless of friends' coital debut, higher levels of friends' private religiosity seem to delay group members' transition to sexual intercourse. There are a number of potential reasons for this relationship. To begin, individuals who are in a more religious friendship group but, nevertheless, transition to sexual intercourse, are likely aware that their friends may not approve of their coital debut. As a result, teens who have their coital debut may conceal from their friends any change to their virginity status, even as they look for less religious friends. Additionally, research on the relationship between individual religiosity and coital debut suggests that after one's sexual debut, personal religiosity changes minimally (Meier 2003). If the change in friends' virginity status minimally influences friends' religious attitudes, then friends' religiosity may continue to delay group members' coital debut. Finally, teens who are in a more religious friendship group, but, nevertheless, transition to sexual intercourse may delay having sexual intercourse again, limiting the overall impact of their coital debut on group norms about premarital sex and opportunities for sexual intercourse.

Although friends' religiosity is significantly related to coital debut, it explained a small proportion of the variance in coital debut. However, the proportion of friends who had transitioned to sexual intercourse explained almost as much variance as respondents' romantic relationship status, which was the most important predictor. Whereas friends' sexual behaviors are closely related to respondent's sexual behaviors, religious norms address a number of different behaviors, including sexual intercourse, making religious norms less proximal for understanding the transition to sexual intercourse when compared to norms about and opportunities for sexual intercourse. Although private religiosity is a characteristic of friends that helps explain coital debut, friends' sexual behaviors are clearly the more important indicator, in part, because they specifically address sex norms and opportunities.

In studies on friendship influences, researchers have given less attention to peer selection, deselection, and rejection processes. Nevertheless, when social scientists find similarities between individuals and their friends using cross-sectional data, socialization or sorting processes may be at work. I found that when adolescents transition to sexual intercourse their friendship group becomes less religious. Likewise, for teens who remained virgins, the level of religiosity within their friendship group increased between the two time periods. These findings suggest that in the process of non-virgins connecting with less religious friends, teens who are still virgins sort into relations with adolescents who are more religious. Using data from the National Longitudinal Study of Adolescent Health, Meier (2003) found that teens did not become less religious, upon transitioning to sexual intercourse (but see Regnerus and Uecker 2006). Nevertheless, I found that they do sort into less religious friendship groups. Taken together these findings suggest that judgment from oneself may be easier to ignore or put aside, than potential or real religious judgment from others.

Parents, other schoolmates, and school and community characteristics are likely important for understanding the link between friends' religiosity and coital debut. Although friends may have the most important proximal effect on teens' sexual behaviors, parents, schools, and communities can have an important indirect and/or mediating influence on teens' sexual behaviors by affecting their friendship choices (Crosnoe, et al. 2003; Smith 2003; Crosnoe and Needham 2004). Parents determine where children live and which school they attend. They can also determine their children's religious participation, the extent to which their children are involved in activities or classes where they will meet certain types of friends, and they can limit the amount of time teens spend with their friends (Heimer and Matsueda 1994; Smith 2003). Classrooms, schools, and communities shape friendship choices by presenting certain social interactional patterns, opportunities, and settings (House 1995; Crosnoe and Needham 2004). Future research might examine how these influences help explain the relationship between coital debut and friends' religiosity.

There are some limitations with this study sample for generalizing these results to American adolescents. Although Add Health investigators sampled a diverse range of schools, we do not know how applicable these results are to American teens in general because the saturated sample is not nationally representative. In order to collect the network data Add Health investigators had to saturation sample entire schools, which makes the sample non-representative. Another limitation with the data is that the peer group, as established during the first wave of data collection, could change before, not after, the transition to sexual intercourse. During the first wave of data collection, a respondent could, for example, be in a fairly religious friendship group that disapproved of premarital sex. One month later, the respondent could shift to a new, less religious friendship group and then transition to sexual intercourse. It would then appear

that the respondent's friendship group changed after coital debut, when really the friendship change preceded the coital debut. Unfortunately, there is no way to model this situation with the data used in this study. The Add Health survey only includes information on friends who attended the same school as the respondent. The attitudes and behaviors of teens who graduated, dropped out, or attended another school could influence teens' behaviors. However, I am unable to determine how the religiosity of friends outside the respondent's school is related to coital debut or the extent to which they provide additional opportunities for sexual relationships.

Finally, this study was interested in the influence of friends' religiosity on the transition to sexual intercourse for heterosexual teens. A minority of teens in this study may have sexual relations with teens of the same sex. Unfortunately, the Add Health survey does not have enough teens who indicated sexual activity with a same-sex partner to adequately conduct an analysis. Since many religions proscribe same-sex sexual behaviors, future research that has the adequate measures might examine whether friends' religiosity also discourages sexual activity with same-sex partners.

To adequately assess the existence of friendship group norms, information from friends is needed, which is a real methodological strength of this analysis. Some symbolic interactionists (Cooley 1902; Thomas and Thomas 1928; Mead 1934) have argued that perceptions of friends may be more important for understanding individuals' behaviors, than friends' actual behaviors and beliefs. For example, Cooley (1902) uses the concept of looking-glass-self to explain that people create an identity, present it to the world, and then adjust it in response to the perceived reaction of others. Although perceptions may help us understand teens' behaviors, they should not be used to assess friends' normative influences, as the perceptions may be unreflective of group norms. Nevertheless, several studies (Treboux and Busch-Rossnagel 1990; DiBlasio and Benda 1994) have used perceptions to assess socializing or social control influences. By drawing on friends' reports, the research presented here significantly improves on past studies that have assessed normative influences.

In addition to perceptions, researchers (DiBlasio and Benda 1994; Thornberry, et al. 1994) often use cross-sectional data to assess the relationship between teens and their friends. With cross-sectional data, however, we do not know whether peer influences precede the behavior under examination. Likewise, data at more than one time point is necessary to examine selection effects. By using longitudinal data to establish the correct causal ordering and testing whether teens sort into less religious friendship groups after having transitioned to sexual intercourse, this study shows not only how other's religious beliefs influence behavior, but also how other's religious beliefs may contribute to group formation and friendship selection.

Recent empirical work in the sociology of religion has found support for the idea that religious contexts influence attitudes and behaviors over and above personal religiosity (Scheepers, et al. 2002; Moore and Vanneman 2003;

Regnerus 2004). This study supports previous research in finding that the transition to sexual intercourse is associated with friends' level of religiosity. Moreover, this study establishes why there is a relationship between friends' religiosity and coital debut: friends' religiosity shapes group norms about pre-marital sex to influence the timing of coital debut *and* teens select friends on the basis of consistency between friends' level of religiosity and whether or not teens have transitioned to sexual intercourse.

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