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Why Virginity Pledges Succeed or Fail: The Moderating Effect of Religious Commitment Versus Religious Participation

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Abstract

Over the past two decades, virginity pledges have proliferated in the US, despite mixed results regarding their effectiveness. Few studies have examined possible mechanisms that may shed light on why pledges work for some individuals but not others. Using a sample of emerging-adults aged 18–24 years old (n = 1,380),we examine the influence of religiosity on pledge signing and adherence, specifically whether the effectiveness of pledges is moderated by religiosity. Findings show that while religious participation is positively associated with signing a pledge, there is amoderating effect of religious commitment. That is, when religious commitment is high, adherence to the pledge is greater. However, for pledge signers with low religious commitment, there are unintended negative consequences with regard to increased participation in risky sexual behaviors, whether compared to other people who signed the pledge who are equally committed to their religion or to individuals who have never taken such a pledge. Implications for research and policy are discussed.

Keywords

Sexual behavior; Virginity pledges; Religiosity; Emerging adults; Health behavior

Introduction

The last decade has seen much debate about the effectiveness of virginity pledges in successfully promoting abstinence until marriage. Virginity pledges “provide adolescents an opportunity to make a written or verbal promise to remain a virgin until marriage” (Bersamin et al. 2005, p. 429). The virginity pledge movement began in 1993 and influenced a significant number of schools and churches across America. The movement was entitled *True Love Waits* that stressed moral values such as abstaining from premarital sex (Bersamin et al. 2005; Regnerus 2007). Two years later, a similar virginity pledge program

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reached prominence, *The Silver Ring Thing*. In this case, adolescents wore a silver ring on the ring finger of their left hand as a symbol of their commitment to remain pure (sexually abstinent) until marriage (Ehrilch 2006). By 1995 it was estimated that approximately 2.2 million adolescents had taken a virginity pledge (Bruckner and Bearman 2005). More recently, a study by Martino and his colleagues (2008) that used a national sample of 12–17 year old, found 23.8 % of adolescents had signed a virginity pledge and females are more likely than males to be pledge signers (Bersamin et al. 2005).

The popularity of virginity pledge programs was likely bolstered by the implementation of the federal Adolescent Family Life Act or “Chastity Act” during the late 1980s and early 1990s as well as the Personal Responsibility and Work Opportunity Reconciliation Act of 1996. These pieces of legislation focused on developing programs that promoted abstinence as the only option for young people to avoid pregnancy and sexually transmitted infection. In 1996, the federal government allocated $50 million for abstinence-only education.

While virginity pledges and abstinence-only sex education are primarily concerned with issues of restricting sex to “divinely-approved marriage,” empirical evidence suggests that risky sexual behavior, including activities such as early sexual debut, multiple sexual partners and inconsistent condom use, is associated a variety of negative outcomes. Extant literature has shown an association between risky sexual behaviors and increased sexual health risks such as sexually transmitted infections (STIs), unplanned pregnancies, as well as cervical and other cancers (Finer and Henshaw 2006; Giuliano et al. 2008; Weinstock et al. 2004).

Rates of these outcomes are particularly high among adolescents and emerging adults. The teenage pregnancy rate in the United States is among the highest of Western industrialized nations and recent data on teenage pregnancy indicates that one out of six adolescent females is expected to become a teen mother (Child Trends 2009). Further, Chaturvedi and colleagues (2011) found that 72 % of samples taken from tumours associated with throat cancer were positive for the sexually transmitted human papilloma virus (HPV), which means that HPV is responsible for more throat cancer than smoking cigarettes. Additionally, Schiffman et al. (2007) found that 70 % of cervical cancer is caused by HPV. Thus, concerns about risky sex go beyond the moral basis upon which virginity pledges are predicated because there are clearly documented health consequences associated with risky sexual behavior. Therefore, it is of public health importance that we identify possible mechanisms that may reduce engagement in risky sexual behaviors.

Evidence for the success of virginity pledges in reducing risky sexual behavior, however, is mixed. Some research suggests that virginity pledges are effective in delaying early sexual initiation among adolescents (Bearman and Bruckner 2001; Martino et al. 2008; Sandfort et al. 2008), whereas other studies have found no such effects for signing a virginity pledge. Bruckner and Bearman (2005) reported that 88 % of all pledgers had intercourse prior to getting married, whereas 99 % of nonpledgers had intercourse prior to getting married. Thus, while virginity pledges failed in their goal to prevent premarital sex nearly 9 out of 10 times, pledge signers were 10 % more likely to abstain from sex prior to marriage compared to individuals who did not sign the pledge. Conversely, a study of 870 adolescents found

that signing a formal virginity pledge did not reduce the likelihood of adolescents' engaging in sexual behavior (Bersamin et al. 2005) and Rostosky et al. (2004) report that males have more sex partners than females regardless of whether or not they sign a virginity pledge. It appears that while the results of previous studies are somewhat mixed and may vary by gender, any deterrent effect of the pledge on premarital sex is quite modest.

Despite the fact that researchers have failed to find consistent success of virginity pledges and other abstinence programs in deterring sexual behavior, proponents of this approach continue to promote public virginity pledging campaigns (Kantor et al. 2008; Kirby 2008). Compounding this problem, there has been little effort to research virginity pledges and sexual behavior in an attempt to empirically assess potential reasons for such inconsistent findings. It is important to understand why virginity pledges are efficacious for some individuals and not others and to identify the mechanisms that link virginity pledges and sexual behavior. One possible mechanism is religion.

Religion and Sexual Behavior

Virginity pledges are usually rooted in religious teachings about sex and morality. Most of the research literature on religion and sex has found religiosity to directly deter or reduce involvement in sexual behavior for adolescents and college students (McCree et al. 2003; Simons et al. 2009; Sinha et al. 2007; Lefkowitz et al. 2004). For instance, Davidson and colleagues (2004) found religious college students to be more likely to delay sexual initiation and have fewer sexual partners. Studies have also demonstrated that religious adolescents are less likely to engage in oral sex (Penhollow et al. 2005; Regnerus 2007). Such evidence has contributed to growing scholarly acceptance of an inverse association between religiosity and sexuality. Additionally, gender differences for the influence of religion on sexual behavior have been reported. For example, women were less likely to report engaging in risky sexual behaviour due to religious values (Baumer and South 2001; Rostosky et al. 2004).

Research on religion, including studies by family scholars, has focused on the social control function it provides for individuals and society (Baier and Wright 2001; Durkheim 1951; Regnerus 2007; Sherkat and Ellison 1999; Simons et al. 2004; Weber 1958). Hirschi and Stark (1969) referred to this as the "hellfire hypothesis" that asserts that deviant behaviors are inversely related to religiosity (Stark 1996). Their hypothesis argued that religion ensures conformity by legitimizing moral values, reinforcing the commitment to those values, and deterring deviance through a threat of eternal punishment. While the hellfire hypothesis explains the role of religious commitment in deterring adolescent participation in sex, it may also shed light on the reasons that virginity pledges are effective for some signers and not others.

Mixed findings on the effectiveness of virginity pledges may be because past studies on virginity pledges control for religiosity (Bersamin et al. 2005) or combine religious commitment and participation into one measure rather than explore whether specific dimensions of religiosity have a moderating effect on sexual behavior. Longest and Vaisey (2008) suggest that the study of religiosity requires an examination of the different processes that lead to differential behavior patterns. Thus, a number of theoretical and empirical

studies on religiosity make such distinctions by referring to the construct of religiosity through two processes: external religiosity and internal religiosity. External religiosity is defined as an individual's participation and involvement in religious activities, such as church or Sunday school attendance. Conversely, internal religiosity refers to the importance an individual places on religion through personal behaviors, such as prayer and meditation (Nasim et al. 2006). Based on these processes, examination is warranted of the extent to which internalized belief (e.g., religious commitment) rather than externalized religion (e.g., participation in religious services) is the mechanism that promotes abstinence until marriage.

Presumably, signing a virginity pledge is a solemn vow for individuals with strong religious commitment but that it has much less meaning for those with low religious commitment. While some individuals may sign a pledge because they find themselves in the social situation in which it is being promoted (i.e., religious participation through attendance at religious services or events), the absence of the internalized beliefs for some signers may explain why the virginity pledge fails in its goal more often than it is successful. Such beliefs are the basis for the abstinence pledge and its success is dependent on these beliefs. Further, if the sole goal is abstinence until marriage and these individuals "fail" at that goal (i.e., they have had sex), there is little reason not to continue having sex. In other words, given the "all or nothing" sentiment inherent in the virginity pledge, once virginity has been "lost," having sex with additional partners would not constitute additional violation of the pledge for individuals with low religious commitment. While high religious commitment in and of itself may continue to have a deterrent effect, the pledge likely loses any deterrent value once it has been violated. As a consequence, the virginity pledge may have unintended negative consequences (e.g., an increase in the number of partners and other risky sexual behaviors) for pledge signers who do not have high religious commitment.

There are other factors that are associated with religiosity, signing a virginity pledge, and participation in risky sexual behavior. Family structure is one factor. Studies have found that living in a two-parent household increases the likelihood of adolescents signing a virginity pledge and reduces participation in risky sexual behavior (Blum et al. 2000; Kirby 2002; Simons et al. 2012). Additionally, prospective studies suggest that certain parenting characteristics such as warmth and support can reduce problematic behaviors—including sexual risk behaviors—by impacting youths' attitudes about risk (Hutchinson et al. 2003; Landor et al. 2011; Murry et al. 2007). Further, other research has reported the associated of both socioeconomic status (SES) and ethnicity with sexual behavior among adolescents (Leonard and Scott-Jones 2010; Santelli et al. 2000).

Because much of the past research on this topic has been conducted using adolescent samples, there is a need for an examination of the effects of virginity pledges on the sexual behavior of individuals age 18 and older. Arnett (2000) coined the term "emerging adulthood," which refers to a new developmental stage between adolescence and young adulthood. Arnett notes that in the past several decades the experiences of most individuals between the ages of 18 and 25 who live in industrialized societies have undergone dramatic changes. Whereas in the past individuals routinely entered into marriage and parenthood in their early twenties, most people now do not make those transitions until they are in their late twenties or even older. Emerging adulthood is described as "a time of exploration and

experimentation" (Grello et al. 2006, p. 255) regarding behaviors and beliefs, especially involving sexuality and religion (Arnett 2000). From a developmental perspective, the lessons and messages learned at earlier stages, such as sex education, continue to influence individuals well beyond adolescence and into emerging adulthood.

The Present Study

The present study extends previous research in several respects. First, we go beyond past research by investigating the extent to which differences in sexual activity among pledge signers may be, in part, due to the moderating role of religiosity on the relationship between signing a virginity pledge and participation in sexual behavior. We expect that pledge signing will achieve its goal of deterring premarital sex only to the extent that it is consonant with the signer's religious beliefs. As a result, we hypothesize that religious commitment, but not participation, will moderate the relationship between pledge signing and sexual abstinence. Second, we test for this possibility using a wider range of sexual outcomes than is usually included in many virginity pledge studies. Our analyses focus upon virginity status, number of intercourse partners, and number of oral sex partners. Third, we examined a sample of college-attending emerging adults to address our research questions. Much of the research on virginity pledges and sexual behavior processes have been conducted entirely on adolescent samples. Thus, investigations of the association between religiosity and sexual behavior in emerging adulthood are important for establishing the significance of religiosity in understanding sexual behavior across the life course. Fourth, because studies have shown that females are more likely than males to be pledge signers and religious (Bersamin et al. 2005; Stoppa and Lefkowitz 2010) and less likely to report engaging in risky sexual behavior (Baumer and South 2001; Rostosky et al. 2004), we examined study outcomes by gender. Lastly, this study controlled for several potentially confounding variables such as family structure, warm and supportive parenting, socioeconomic status (SES), and ethnicity because studies have found that each of these factors is associated with participation in risky sexual behavior.

Method

Participants

Data were collected from participants who attended a large, public Southeastern state university (n = 1,380; 410 males, 970 females). Participants ranged in age from 18 to 24 years old (M = 20 years old; SD = 1) and were recruited from family studies, consumer economics and sociology classes during the 2008–2009 academic year. Questions focused on family of origin and other issues such as relationship experiences and attitudes and behaviors regarding sex and substance use. Given the inclusion of several sensitive questions, surveys were proctored like an exam and there were no identifiers on the survey instrument. Although an alternative exercise was available for any student who did not wish to participate, all students present on the day the survey was administered elected to participate in the survey and received extra credit for doing so. Institutional review board approval was obtained prior to study implementation and informed consent was obtained from all participants. Only non-married, heterosexual participants were included in the study given the small number of participants who reported being married or identified as

homosexual. A majority of the sample (73 %) were White, 19 % were African American, 2 % were Hispanic, 4 % were Asian, and 2 % identified as "other." Fifty-six percent of the respondents reported that they had been reared in two-parent households.

Measures

Virginity status—Virginity status was measured by asking respondents to indicate whether they ever had sexual intercourse, which was defined as penile/vaginal penetration. Response categories were 0 (*never had sex*) and 1 (*had sex*).

Number of intercourse partners: Number of intercourse partners was measured by asking respondents to report on their number of vaginal-penile intercourse partners. Response categories were 0 (*none*), 1 (*one*), 2 (*two to four*), 3 (*five to nine*), and 4 (*ten or more*).

Number of oral sex partners: Number of oral sex partners was assessed by asking respondents to report on their number of individuals with whom they had engaged in oral-genital contact. Response categories were 0 (*none*), 1 (*one*), 2 (*two to four*), 3 (*five to nine*), and 4 (*ten or more*).

Virginity pledge: Respondents were asked if they have ever taken or signed a chastity (virginity) pledge, promising that they would abstain from sex until marriage for religious reasons. The response categories were 0 (*no*) and 1 (*yes*).

Gender: Gender was coded 0 (*females*) and 1 (*males*).

Religious commitment: Religious commitment was assessed using two items. The first item asked respondents to report on the level of religious influence in their daily lives. Responses ranged from 1 (*none*) to 5 (*very influential*). The second item asked respondents to indicate how often they pray or seek spiritual comfort. Responses ranged from 1 (*never*) to 5 (*more than once per day*). The two items were combined to form a religious commitment scale where high scores indicate higher levels of the religious behavior. The Cronbach alpha for the religious commitment scale was .81.

Religious participation: Religious participation was measured by asking respondents to report on how often they attended religious services (church, Sunday school, youth group, etc.). Responses ranged from 1 (*never*) to 4 (more *than once per week*).

Family structure: Family structure was measured by asking respondents to report their parents' marital status. Responses were coded so that 0 (*one parent/caregiver in the home)* and 1 (*two parents/caregivers in the home)*.

SES: SES was assessed by asking respondents to indicate their family's approximate total income. The responses ranged from 1 (*less than $30,000*) to 5 (*more than $150,000*).

Ethnicity/Race: Ethnicity/race was assessed by asking respondents to report their race/ethnicity. The response categories were 1 (*European American/Caucasian/White*), 2 (*African American/Black*), 3 (*Hispanic/Latino*), 4 (*Asian/Pacific Islander*), 5 (*Other*). This

item was recoded into a binary variable with 1 (*European American/Caucasian/White*) and 0 (*Minority/other*).

Parental warmth/support: *Parental warmth/support* was taken from the measure developed in the Iowa Youth and Families Project (IYFP; Conger and Elder 1994). It included four items that asked respondents to indicate how often their primary caregiver listens carefully to their point of view, acts loving and affectionate towards them, has a good laugh with them about something that is funny, tells them he/she loves them. Responses ranged from 0 (*never*) to 4 (*always*). The Cronbach alpha for the parental warmth/support scale was .72. Items were coded so that high scores indicate high levels of parental warmth/support.

Analytic Plan

Hierarchical regression analyses were conducted to test for the main and interaction effects of religiosity and pledge signing on emerging adults' virginity status, number of intercourse partners, and number of oral sex partners. This type of regression model allows research to specify a fixed order of entry for variables in order to control for the effects of covariates or to test the effects of certain predictors independent of the influence of others. To reduce multicollinearity, the continuous predictor variables were centered at the mean prior to calculation of the interaction terms (Aiken and West 1991). All regression models controlled for family structure, ethnicity, socioeconomic status, and parental warmth/support. For each regression analysis, the control and main effect variables (e.g., religious commitment, religious participation, virginity pledge signing, and gender) were entered at Model 1, two-way interaction terms (religious commitment × virginity pledge signing, religious commitment × gender, religious participation × virginity pledge signing, religious participation × virginity pledge signing, virginity pledge signing × gender) were entered at Model 2, and three-way interaction terms (religious commitment × virginity pledge signing × gender, religious participation × virginity pledge signing × gender) were entered at Model 3 (Aiken and West 1991). Analyses were performed using SPSS Version 17 software package (SPSS 2008).

Respondents' virginity status was predicted using a hierarchical logistic regression models. χ^2 difference tests were used to assess improvement in fit for successive models. Number of intercourse and number of oral sex partners were estimated using hierarchical multiple regression models. Post hoc analyses were conducted on all the significant interaction effects using the Johnson–Neyman (J-N) technique that is an alternative to the Aiken and West (1991) approach to probing interactions. The J-N technique identifies regions of significance that are areas where the regression lines are significantly different from one another (Hayes and Matthes 2009; Bauer and Curran 2005).

Results

Descriptive Statistics

Twenty-seven percent of respondents reported signing a virginity pledge. Means, standard deviations, and correlations between study variables are presented in Table 1. Appropriate

statistics were used to calculate bivariate correlations on binary variables. Table 2 presents the summary statistics within each virginity pledge category (e.g., pledgers and non-pledgers) for respondents who have or have not engaged in sexual intercourse and oral sex. Results indicate that 65 % of pledgers have engaged in sexual intercourse and 77 % of pledgers have engaged in oral sex.

Multivariate Statistics

Table 3 shows the results from the hierarchical logistic regression analyses predicting the log odds of having had sexual intercourse when controlling for family structure, ethnicity, socioeconomic status, and parental warmth. The main effect of pledge signing and religious commitment was found to be significant. Pledge signing remained significant in the succeeding models while religious commitment approached significance. Results indicate that signing a virginity pledge is associated with a 45.8 % decrease in the odds of having had intercourse. Only the interaction variable, religious commitment × pledge, emerged as statistically significant in Model 2 suggesting that the effect of pledge signing is enhanced when it occurs in combination with religious commitment. The three-way interaction of gender by religious commitment by pledge was analyzed but found not to be significant. Next, post hoc analysis using the Johnson–Neyman technique was performed to analyze the significant interaction between religious commitment and pledge signing. As shown in Fig. 1, there is no association ($p > .05$; flat line) between religious commitment and the odds of having had intercourse for nonpledgers. However, there is a strong association ($p < .05$; steep line) between religious commitment and the odds of having had intercourse for pledgers. The shaded area on the figure shows that pledgers have lower odds of having had intercourse than non-pledgers when religious commitment was greater than −.07 SD above the mean.

Table 4 presents the hierarchical multiple regression results predicting the number of intercourse partners. Model 1 shows that the main effects of religious commitment, pledge signing, and gender are significantly associated with the number of intercourse partners after taking into account the control variables. Both religious commitment and gender remained significant in the succeeding models. That is, respondents who reported more religious commitment tended to report fewer intercourse partners and males tended to report more intercourse partners. The 2-way interaction effects were added in Model 2. Only the interaction terms, religious commitment × pledge and religious commitment × gender, emerged as statistically significant. Next, in order to test whether the effects of the study variables vary by gender, three-way interactions were tested but results they were not significant. Figure 2 depicts the post hoc analyses of the interaction between religious commitment × pledge. Although the figure shows that religious commitment is related to fewer intercourse partners for both pledgers and non-pledgers, it also depicts an interesting cross-over effect. The shaded areas indicate that pledgers have significantly fewer intercourse partners than non-pledgers when religious commitment is greater than .16 *SD* above the mean but have significantly more intercourse partners than non-pledgers when religious commitment is less than −1.07 *SD* below the mean.

Although not depict in the interest of saving space, the post hoc analysis of the interaction between religious commitment and gender showed that females who reported high levels of religious commitment tended to report having fewer intercourse partners than males who reported high levels of religious commitment.

Hierarchical multiple regressions predicting the number of oral sex partners are presented in Table 5. Model 1 shows that the main effect of religious commitment and gender are significant after controlling for family structure, ethnicity, socioeconomic status, and parental warmth. The succeeding models show significant main effects of religious commitment, religious participation, and gender. That is, emerging adults who reported more religious commitment tended to report fewer oral sex partners, whereas emerging adults who reported more religious participation or who were male tended to report more oral sex partners. The 2-way interaction effects were added in Model 2. As was the case for number of intercourse partners, the interactions of religious commitment × pledge and religious commitment × gender were found to be significant. Three-way interactions that included gender were also conducted but were not significant. Post-hoc analyses were performed on the significant 2-way interactions. Figure 3 depicts the interaction between religious commitment and pledging. The figure shows that religious commitment is associated with the number of oral sex partners for both pledgers and non-pledgers, but, as was the case for number of intercourse partners, the regression lines cross suggesting an interesting cross-over effect. The shaded areas indicates that pledgers have significantly fewer oral sex partners than non-pledgers when religious commitment is greater than .16 *SD* above the mean but have significantly more oral sex partners than non-pledgers when religious commitment is less than −.49 below the mean.

In the interest of saving space, the graph for religious commitment by gender is not shown. It indicated, however, that females who reported high levels of religious commitment tended to report having fewer oral sex partners than males who reported high levels of religious commitment.

Discussion

Virginity pledges continue to proliferate despite evidence suggesting mixed results in their promotion of abstinence until marriage. Twenty-seven percent of respondents in the present study report signing a virginity pledge. This percentage is consistent with rates reported by a recent study using a national sample (Martino et al. 2008) and provides evidence that virginity pledges remain relatively common. Results also show that approximately two-thirds of virginity pledge signers in the study report not being a virgin and 77 % of pledge signers had engaged in oral sex. Findings indicate that in the majority of cases, the pledge largely fails in its goal to promote sexual abstinence until marriage. These patterns are also consistent with previous studies by Bruckner and Bearman (2005) and Uecker (2008), which found that a significant number of pledge signers eventually engage in premarital sexual intercourse. Thus, given the prevalence of virginity pledges and the adverse health outcomes associated with risky sexual behavior, our results underscore the salience of examining possible mechanisms through which the pledge has an effect.

Given that virginity pledges are usually rooted in religious teachings about sex, we explored the moderating role of religiosity on the relationship between signing a virginity pledge and participation in sexual behavior. Further, we addressed the impact of religious commitment separately from the impact of religious participation by examining the extent to which internalized beliefs and values (e.g., religious commitment) are the mechanism that promotes abstinence until marriage rather than mere participation in religious services such as church or Sunday school. Thus, we expected that the pledge would only deter sex if the pledge signer had high religious commitment but not if they had high religious participation without religious commitment. Findings provided strong support for this idea.

Additionally, we hypothesized that not only would signing the virginity pledge deter sexual activity for pledge signers with high religious commitment but that pledge signers with low religious commitment would have greater participation in risky sexual behaviors than either their more religious counterparts or non-pledge signers. Results indicated cross-over effects where pledgers had fewer intercourse and oral sex partners than non-pledgers when religious commitment was high but pledgers had more intercourse and oral sex partners than non-pledgers when religious commitment was low. Thus, consistent with our hypothesis, the abstinence effect of pledge signing on sexual behavior was amplified by religious commitment and the likelihood of participation in risky sexual behaviors was amplified by low commitment. This study is the first to illustrate cross-over effects for intercourse in that pledge signers with low religious commitment have more intercourse partners than non-pledge signers.

The finding that pledge signers with low religious commitment have more oral sex partners than non-pledge signers is consistent with previous research suggesting that virginity pledges encourage risky noncoital sexual behaviors as a way for pledgers to “preserve” their virginity (Bruckner and Bearman 2005; Regnerus 2007). It is important to note the significant health risks associated with oral sex. For example, D’Souza (2007) reported that the risk of throat cancer was more than doubled for individuals who had one to five oral sex partners in their lifetime and those with more than five oral sex partners had a 250 % increased risk, compared to individuals who had never engaged in the activity. Therefore, attempts to preserve virginity as the only worthy goal of sexual abstention may increase the likelihood of participation in risky noncoital behaviors that have potentially serious individual and public health consequences.

Gender differences were found for both the intercourse and oral sex outcomes. The interaction between religious commitment and gender show that females who report high levels of religious commitment tended to report having fewer intercourse and oral sex partners than males who report high levels of religious commitment. These findings are consistent with research showing that males engage in more risky sexual behaviors than females, regardless of their level of religiosity (Rostosky et al. 2004).

Across all sexual behavior outcomes, it appears that for those with high religious commitment, virginity pledges delay sexual debut and other risky sexual behaviors rather than provide complete abstinence from sex. While two-thirds of all pledge signers reported having intercourse and over three-quarters reported having oral sex, engagement in these

behaviors was significantly lower for pledge signers with high religious commitment. Because we were unable to assess use of condoms or other contraceptives, it is not known whether or not the sexually active individuals practiced safer sex or how that may vary by degree of religiosity.

Understanding the mechanisms that explain the effectiveness of virginity pledges can inform policymakers and health educators about the wisdom in the continued use of virginity pledges as an approach to deterring risky sexual behavior among adolescents and emerging adults. With an “all or nothing” abstinence approach to sexual decision making, once the pledge has been broken or violated, there is little reason not to continue to have sex with other partners. Pledge signers without the necessary beliefs to reinforce the abstinence pledge (e.g., those with high religious participation but low religious commitment) are especially vulnerable to making ill-informed decisions about sex when they find themselves confronted with sexually charged situations (Perrin and DeJoy 2003). To this end, virginity pledges may not be preparing adolescents and emerging adults to protect themselves if and, more likely, when they engage in sexual behavior. If maintaining virginity until marriage is the only goal and most individuals “fall short” of that goal, they may be at additional threat of pregnancy, STI transmission, cervical cancer and other problems associated with risky sexual behaviors. This would especially be true for individuals who received abstinence-only versus comprehensive sex education.

A few limitations of the present study should be noted when interpreting the results. First, our study was limited to a sample of emerging adults who are enrolled in college. Although this is a very important group to study because they have been found to engage in high levels of risky sexual behavior (Grello et al. 2006), the findings from this study may be limited in its generalizability to other groups of emerging adults not attending college. Future research replicating the present study with a nationally-representative sample is warranted. Second, like most of the past research on this topic, the study was a cross-sectional design that used retrospective self-reports. Future studies would benefit from a longitudinal, prospective study design that will enable researchers to gain a better picture of the temporal ordering of study variables. Third, we were constrained by the study’s measures. We were not able to assess respondents’ condom use. This may be important because extant research has demonstrated a link between religion and condom use (Zaleski and Schiaffino 2000). The measures of religiosity were limited to only three items, which did not allow us to fully investigate all aspects of religious participation and commitment. Finally, we were not able to determine whether participants were giving and or receiving oral sex. Research suggests that this may have different implications and risks (Bersamin et al. 2005). Ideally, future research will include a more comprehensive measure of religiosity and sexual behaviors as well as an assessment of condom use.

Despite study limitations, our results make three significant contributions to the literature. First, we unpacked the influence of religion to examine the unique contributions of religious participation and commitment in the signing of and adherence to virginity pledges. Second, we included a wider range of sexual behaviors as outcomes than has been the case with previous research. Third, we offered an explanation for the previous pattern of mixed findings regarding the effectiveness of virginity pledges. In doing so, we went beyond past

research that addresses the influence of religion on sexual behavior to demonstrate the moderation effect of religious commitment on sexual activity among pledge signers as well as between signers and non-signers. The finding that pledge signers with low religious commitment have more oral sex and intercourse partners than non-signers may shine a light on the unintended negative consequences of this particular abstinence-only approach. Though this study was not able to directly measure whether non-pledge signers received abstinence-only sex education, it is reasonable to assume that those who signed a virginity pledge were exposed to this approach.

There are several policy implications for our findings. If, as our findings suggest, abstinence-only education is found to be somewhat efficacious only for religious individuals, then it is questionable whether state and federal funds should be allocated for such teachings. Unfortunately, this important issue does not appear to be free of politics. According to Perrin and DeJoy (2003), in 2002 the Centers for Disease Control evaluated various sex education programs and identified five that worked to delay age at first intercourse, number of partners, and increased the practice of safer sex. None of them were “abstinence-only” programs. Perrin and DeJoy (2003) note that this information was posted on the url: http://www.cdc.gov/nccdphp/dash/rtc/ and was subsequently removed from the CDC website. Instead the following statement from the Department of Health and human services (HHS) press office was posted: “HHS is committed to continuing efforts to prevent out-of-wedlock teen pregnancies and to encourage adolescents to remain abstinent. President Bush and Secretary Thompson are committed to promoting abstinence education programs and dissemination of information on promising approaches… President Bush’s budget for fiscal year 2003 provides an additional $33 million in funding for abstinence education, fulfilling the President’s promise to increase abstinence funding to $135 million.”

The federal funding of abstinence-only sex education has only increased in recent years. While President Obama’s proposed budget for 2010 eliminated federal funding for abstinence-only sex education in favour of comprehensive sex education proven to be effective, Congress restored that funding in the amount of $250 million over 5 years (Stein 2010). During the last decade, abstinence-only funding added up to more than $1.5 billion (Stein 2010). In addition to a lack of evidence in support of these programs, as well as recommendations for the implementation of comprehensive sex education in schools by national organizations such as the American Medical Association, the American Academy of Pediatrics and the National Academy of Sciences, legislators continue to pour money into programs that focus exclusively on abstinence as the deterrent to unwanted teen pregnancy and exposure to STIs. Our results provide additional evidence against the effectiveness of these programs and further cause to question continued government funding.

Additionally, there is data to suggest that these programs do not reflect the attitudes or behaviors of the American people. Roughly 9 in 10 Americans support teaching comprehensive sex education in schools, including information on contraception and how to protect oneself from STIs (Mayer 1996; Landry et al. 2004). Given that sex before marriage is an almost universal phenomenon in the US, evidence-based education programs should be promoted by researchers, practitioners, and policy makers. For instance, using data from the National survey of family growth, Kohler et al. (2008) found that teens who received

comprehensive sex education were 50 percent less likely to experience pregnancy than those who received abstinence-only education and Kirby et al. (2007) reported that, on average, 40 percent of youth exposed to comprehensive sex education delayed sexual initiation, reduced the number of sexual partners, or increased condom/contraceptive use.

Finally, and perhaps most importantly, our findings suggest the need to re-examine the social cost of programs that have not been demonstrated to reduce participation in risky sexual behaviors and may, in fact, increase risk in some areas. Initiatives such as virginity pledges and other abstinence-only programs that may put a majority of their participants at greater danger of unintended pregnancy or serious STIs than individuals who were not exposed to the program are not in the best interest of families, schools, or society.

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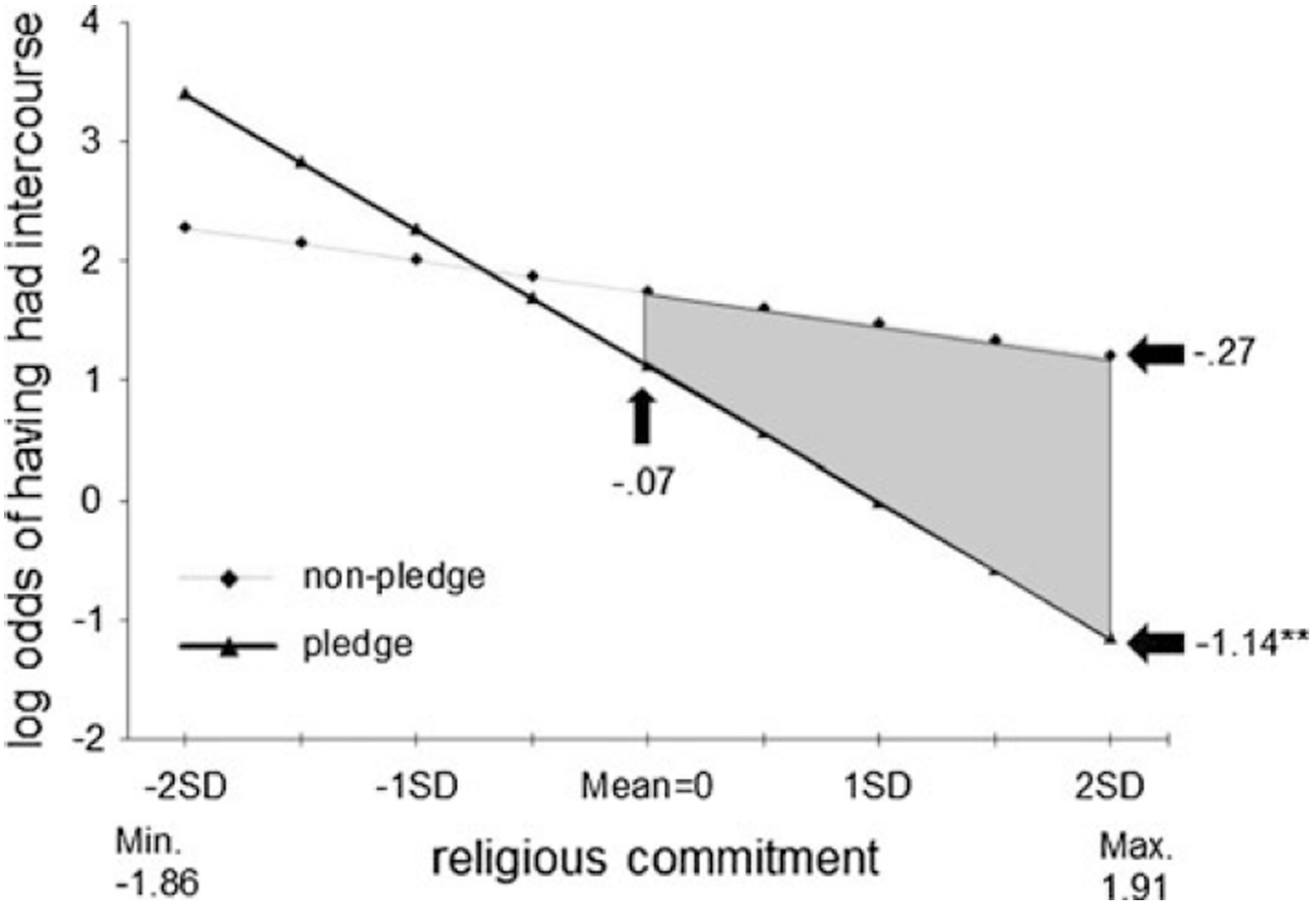

Fig. 1.

Religious commitment as a moderator between pledge signing and log odds of having had intercourse. Graph represents the Johnson–Neyman (J-N) technique for testing interactions. *Shaded area* identifies regions of significance ($p \leq 05$) where the regression *lines* are significantly different from one another

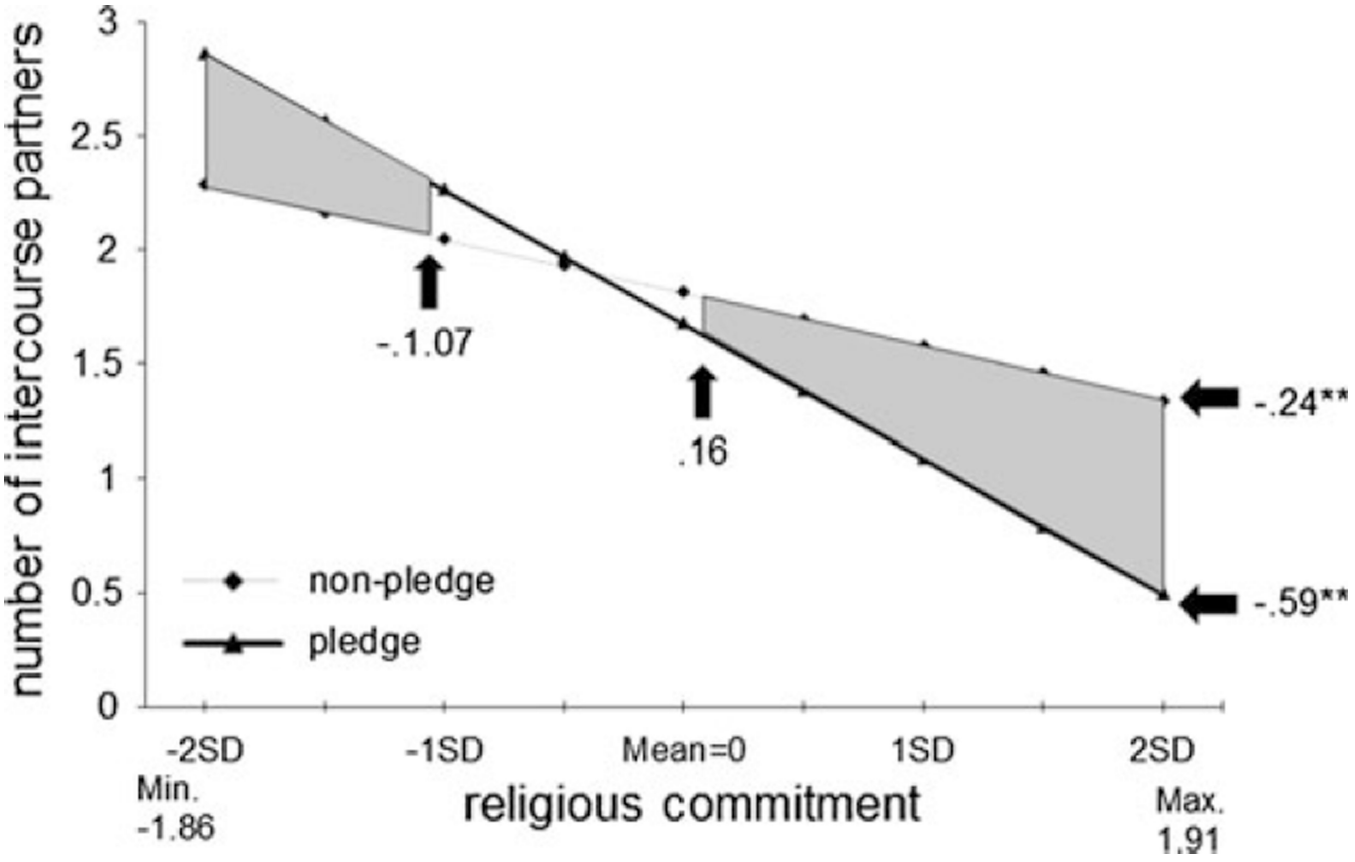

Fig. 2.

Religious commitment as a moderator between pledge signing and number of intercourse partners. Graph represents the Johnson–Neyman (J-N) technique for testing interactions. *Shaded area* identifies regions of significance ($p \leq 05$) where the regression *lines* are significantly different from one another

Fig. 3.

Religious commitment as a moderator between pledge signing and number of oral sex partners. Graph represents the Johnson–Neyman (J-N) technique for testing interactions. *Shaded area* identifies regions of significance ($p \leq 05$) where the regression *lines* are significantly different from one another

Table 1

Summary of means, standard deviations, and intercorrelations among study variables

	1	2	3	4	5	6	7	8	9	10	11
1. Family structure (two-parent)	–										
2. Ethnicity (white)	.30**	–									
3. SES	.04	.13**	–								
4. Parental warmth	.57**	.44**	−.09**	–							
5. Gender (male)	.12**	.09**	.01	.12**	–						
6. Virginity pledge (yes)	−.08**	−.06*	−.01	−.14**	−.19**	–					
7. Religious participation	−.19**	−.16**	.06*	−.28**	−.21**	.47**	–				
8. Religious commitment	.35**	.21**	−.14**	.45**	−.05**	.14**	.26**	–			
9. Virginity status (yes)	−.25**	−.13**	.11**	−.23**	.07**	−.27**	−.19**	−.40**	–		
10. Number of intercourse partners	−.26**	−.10**	.12**	−.22**	.10**	−.12**	−.11**	−.38**	.65**	–	
11. Number of oral sex partners	−.30**	−.12**	.24**	−.34**	.11**	−.05*	−.01	−.45**	.58**	.72**	–
Mean	.56	.73	4.01	16.02	.30	.27	3.09	5.45	.82	1.92	2.25
SD	.50	.44	1.10	4.03	.46	.44	1.22	2.38	.39	1.25	1.27

N = 1,380.

** $p \leq .001$;

* $p \leq .05$ (two-tailed tests); binary variables are coded (1, 0) and the labels in parentheses represent the highest score

Table 2

Frequencies of sexual behavior by pledge signing status

Variables	Total	Pledge signers	Non pledge signers
Total		373	1,007
Virginity status			
Virgin	250	130 (35 %)	120 (12 %)
Non virgin	1,130	243 (65 %)	887 (88 %)
Number of oral sex partners			
None	176	86 (22 %)	90 (9 %)
One or more	1,204	287 (77 %)	917 (91 %)

Table illustrates raw numbers and percentages

Table 3

Binary logistic regression analysis predicting virginity status, controlling for background variables

Variable	Model 1		Model 2		Model 3	
	B	Odds ratio	*B*	Odds ratio	*B*	Odds ratio
Control variables						
Family structure (married)	−1.07	0.34**	−1.03	0.36**	−1.02	0.36**
Ethnicity (White)	−0.28	0.76	−0.18	0.83	−0.18	0.84
SES	0.28	1.32**	0.27	1.31**	0.27	1.31**
Parental warmth	−0.07	0.93*	−0.07	0.94*	−0.07	0.94*
Main effects						
Religious commitment	−0.66	0.52**	−0.27	0.76	−0.27	0.76
Religious participation	−0.16	0.85	−0.17	0.85	−0.20	0.82
Pledge signing	−1.16	0.31**	−0.58	0.56*	−0.61	0.54*
Gender	0.19	1.21	0.24	1.27	0.26	1.30
Two-way interactions						
Religious Commitment × Pledge			−0.87	0.42**	−0.87	0.42**
Religious Commitment × Gender			−0.13	0.88	−0.15	0.86
Religious Participation × Pledge			−0.01	1.00	0.08	1.09
Religious Participation × Gender			−0.18	0.84	−0.06	0.94
Pledge × Gender			0.15	1.16	0.65	1.91
Three-way interactions						
Religious Commitment × Pledge × Gender					−0.09	0.91
Religious Participation × Pledge × Gender					−0.69	0.50
2 log likelihood	978.811		959.609		958.413	
Pseudo R square	0.345		0.363		0.364	

** $p \leq .001$;

* $p \leq .05$ (two-tailed); Religious Commitment & Religious Participation are standardized by z-transformation (*mean* = 0 & *SD* = 1)

Table 4

Regression analysis predicting number of intercourse partners, controlling for background variables

Variables	Model 1			Model 2			Model 3		
	B	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β
Control variables									
Family structure (married)	−0.47	0.13	−0.18**	−0.41	0.08	−0.16**	−0.41	0.13	−0.16**
Ethnicity (White)	−0.01	0.08	−0.01	−0.01	0.08	0.00	−0.01	0.08	0.00
SES	0.09	0.03	0.08**	0.08	0.03	0.07**	0.08	0.03	0.07**
Parental Warmth	0.00	0.01	−0.01	0.00	0.01	0.00	0.00	0.01	0.00
Main effects									
Religious Commitment	−0.35	0.04	−0.28**	−0.23	0.05	−0.19**	−0.24	0.06	−0.19**
Religious Participation	−0.03	0.04	−0.03	0.00	0.05	0.00	0.00	0.05	0.00
Pledge Signing	−0.18	0.08	−0.07*	−0.13	0.10	−0.05	−0.13	0.10	−0.05
Gender	0.24	0.07	0.09**	0.20	0.08	0.07**	0.20	0.08	0.07*
Two-way interactions									
Religious Commitment × Pledge				−0.36	0.07	−0.19**	−0.36	0.07	−0.19**
Religious Commitment × Gender				0.20	0.08	0.08*	0.21	0.10	0.08*
Religious Participation × Pledge				0.03	0.08	0.01	0.03	0.09	0.02
Religious Participation × Gender				−0.29	0.09	−0.12	−0.29	0.10	−0.12
Pledge × Gender				−0.07	0.20	−0.01	−0.05	0.23	−0.01
Three-way interactions									
Religious Commitment × Pledge × Gender							−0.03	0.18	−0.01
Religious Participation × Pledge × Gender							−0.02	0.24	0.00
Adjusted R^2		0.182			0.208			0.207	

Numbers in parentheses are standard errors

** $p \leq .001$;

* $p \leq .05$ (two-tailed); Religious Commitment & Religious Participation are standardized by z-transformation *(mean* = 0 & *SD* = 1)

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Table 5

Regression analysis predicting number of oral sex partners, controlling for background variables

	Model 1			Model 2			Model 3		
Variables	***B***	***SE B***	**β**	***B***	***SE B***	**β**	***B***	***SE B***	**β**
Control variables									
Family structure (married)	−0.39	0.07	−0.15**	−0.34	0.07	−0.13**	−0.34	0.07	−0.13**
Ethnicity (White)	0.04	0.07	0.01	0.07	0.07	0.02	0.07	0.07	0.02
SES	0.21	0.03	0.18**	0.19	0.03	0.17**	0.19	0.03	0.17**
Parental Warmth	−0.03	0.01	−0.09**	−0.03	0.01	−0.08**	−0.03	0.01	−0.08*
Main effects									
Religious commitment	−0.42	0.04	−0.33**	−0.31	0.05	−0.24**	−0.31	0.05	−0.24**
Religious participation	0.06	0.04	0.05	0.12	0.05	0.10*	0.11	0.05	0.09*
Pledge signing	−0.08	0.07	−0.03	0.02	0.09	0.01	0.00	0.09	0.00
Gender	0.34	0.07	0.12**	0.28	0.08	0.10**	0.30	0.08	0.11**
Two-way interactions									
Religious Commitment × Pledge				−0.39	0.06	−0.20**	−0.39	0.07	−0.20**
Religious Commitment × Gender				0.21	0.08	0.08*	0.19	0.09	0.08*
Religious Participation × Pledge				−0.09	0.08	−0.04	−0.06	0.08	−0.03
Religious Participation × Gender				−0.26	0.08	−0.11	−0.22	0.09	−0.09
Pledge × Gender				0.09	0.19	0.01	0.20	0.22	0.03
Three-way interactions									
Religious Commitment × Pledge × Gender							0.04	0.17	0.01
Religious Participation × Pledge × Gender							−0.22	0.23	−0.04
Adjusted R^2		0.281			0.309			0.308	

Numbers in parentheses are standard errors

** $p \leq .001$;

* $p \leq .05$ (two-tailed); Religious Commitment & Religious Participation are standardized by z-transformation (*mean* = 0 & *SD* = 1)