



The Moderating Role of Sexual Orientation in the Association Between Religiosity and Sexual Behaviors Among College Students

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Abstract

Past research has shown that religiosity can impact sexual behaviors of college-aged youth in both positive and negative directions. As many world religions promote doctrines that include negative views toward sexual minorities, the current study aimed to examine the potentially differential ways religiosity is related to sexual behaviors across various sexual orientations. College/university students across Oregon ($N = 1553$) completed an online cross-sectional survey in which they provided information about their sexual orientation, levels of religiosity, religious affiliation, and endorsed recent sexual behavior outcomes. Using logistic models in PROCESS, sexual orientation was examined as a moderator of the relations between religiosity (assessed via the Centrality of Religiosity Scale; Huber & Huber) and religious affiliation and the occurrence (yes vs. no) of three sexual behaviors in the past 6 months: birth control use during sex, sexual activity under the influence of substances, and testing positive for an STI. Covariates were age and natal sex. Religiosity was related to reduced birth control use in heterosexual and gay/lesbian individuals. Religiosity was not associated with sexual behaviors in bi/pansexual college students. Findings show that religiosity was a salient construct for understanding sexual behaviors in heterosexual and gay/lesbian college students, but not in bi/pansexual college students. Given that religiosity has differential effects for various sexual behaviors that can heighten risk of negative sexual health outcomes, recommendations are made for increased and tailored sexual health education to religiously identified college students.

Keywords Sexual health · LGBTQ+ · Religion · University students · Sexually transmitted infection

Introduction

College or university attendance during young adulthood can provide a unique setting for engaging in sexual behaviors and exploring one's sexuality (Garcia et al., 2012). In fact, approximately 60–80% of American college students engage in casual hookup behaviors (Garcia et al., 2012). This exploration of sexuality is developmentally appropriate and consistent with the developmental stage of emerging adulthood (Garcia et al., 2012; Stinson, 2010), yet may lead to increased engagement in sexual behaviors that heighten risk of experiencing negative mental and physical health outcomes. Such behaviors can include increased likelihood of

engaging in sexual behaviors under the influence of alcohol (Dvorak et al., 2016; Hittner et al., 2016; Marcantonio & Jozkowski, 2023), and reduced contraceptive use (Dolphin et al., 2018; Lefkowitz et al., 2019).

These sexual behaviors (e.g., sex under the influence of substance or reduced contraceptive use) in college students can result in a number of unwanted negative sexual health outcomes such as an unwanted pregnancy, the experience of unwanted or negative sexual contact, or testing positive for a sexually transmitted infection (STI) (Centers for Disease Control & Prevention,). For example, in the USA, individuals aged 15–24 make up nearly half of all new STI infections yearly despite making up only 27% of the total sexually active population (Centers for Disease Control & Prevention, 2021b). While much of this research has focused on a wider age range, there is some evidence to suggest that college-aged individuals are the driving force behind these increases (Johnson & Jackson, 2021).

Because of the elevated prevalence of sexual behaviors that increase risk of negative sexual health outcomes

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in college or university students, it is important to examine various demographic factors that may uniquely relate to behaviors such as reduced contraceptive use and engaging in sexual activity under the influence of substances. Doing so will allow for identifying relevant groups which may benefit from targeted prevention and intervention efforts. Two demographic factors of importance when understanding sexual health in college students are sexual orientation (i.e., identifying as heterosexual, lesbian, gay, bisexual, etc.) and religiosity. While there has been some attention paid to the unique effects of these factors on sexual health in college students (discussed further in the next sections), very limited research has evaluated the interactions between religiosity, sexual minority status (i.e., identifying with a sexual orientation other than heterosexual), and sexual behaviors of college populations.

Religion and Sexual Health

One aspect of culture and community that may affect the type of sexual behaviors college students engage in is religiosity, or the level to which someone adheres to their religion's beliefs, values, and practices. Religiosity has the potential to impact many health behaviors including sexual activity due to religiosity's widespread influence on one's community, behaviors, beliefs, and sense of purpose (Park, 2007). For example, religiosity could potentially reduce sexual behaviors that heighten risk of STI or other unwanted sexual outcomes through several mechanisms including behavioral doctrines prohibiting non-monogamous sexual activity or increasing the likelihood of participating in a religious peer group (reducing exposure to sex and substances). Conversely, these same doctrines may have the potential to increase sexual related shame and guilt for individuals engaging in non-monogamous sexual activity (Marcinechová & Záhorková, 2020), which in turn can be related to sexual behaviors such as reduced contraceptive use (Emmers-Sommer et al., 2018). In general, increased religiosity tends to be negatively associated with engaging in sexual activity, such that greater levels of religiosity are related to reduced affectionate, intimate touching; oral sex behaviors; and odds of engaging in sexual intercourse. For religious individuals who do engage in sexual activity, religiosity (e.g., personal religiosity, friends' religiosity, time spent in religious secular activities, and parental religious attendance) is associated with higher age at first sex and lower number of sexual partners (Adamczyk, 2012; Koletic et al., 2021; Langlais & Schwanz, 2017).

The literature regarding religiosity and sexual behaviors among those who are sexually active and negative sexual outcomes seems to be less clear cut, however, as some studies reveal protective relationships while others have found that religiosity may be a risk factor. Specifically, among college students, religiosity is negatively associated with sexual

behaviors that increase likelihood of negative sexual health outcomes such as experiencing an STI, an unwanted pregnancy, or negative sexual contact or sexual assault (Armstrong et al., 2020; McGraw et al., 2020). Conversely, measures related to religiosity such as regular parental church attendance and strong parental religious beliefs seem to be correlated with decreased odds of contraceptive use and fewer discussions about birth control and sex (Pearce et al., 2019; Regnerus, 2016), which is related to increased STI risk. These findings were partially confirmed by a recently published meta-analysis of studies using youth samples, which identified that religiosity was protective against age at sexual debut and number of sexual partners, but had no association with contraceptive use (Koletic et al., 2021). Religiosity's impact on sexual health is nuanced and complex, such that it appears to be protective for some behaviors and outcomes, and a possible risk factor for others. However, the literature examining the associations between religiosity and sexual behaviors is limited, especially when examining sexual behaviors particularly relevant to college students.

Sexual Orientation and Sexual Health

As previously stated, an important factor that impacts sexual health in college students is identification with a minoritized sexual orientation (i.e., identifying as lesbian, gay, bisexual, or any identity other than heterosexual). Broadly, sexual minority college students may experience elevated negative mental and physical health outcomes in part due to the experience of minority stress, or internal and external stressors one faces due to their minoritized status in society (Brooks, 1981; Meyer, 2003; Woodford et al., 2014, 2015). The experience of minority stress may also confer an additional risk for sexual behaviors that increase likelihood of unwanted sexual outcomes specifically (Kuyper & Vanwesenbeeck, 2011). Much of the research in this field has focused on adolescence; however, evidence suggests sexual minority college students have a greater number of sexual partners than their heterosexual peers (Martin-Storey & Fromme, 2021; Oswalt & Wyatt, 2013). Further, sexual minority college-aged women in particular report greater levels of reduced contraceptive use (e.g., intrauterine device, pill, condom; for bisexual women in particular) and a greater number of sexual partners (Blunt-Vinti et al., 2018; McGraw et al., 2020).

Having a minoritized sexual orientation is also related to greater risk of experiencing negative sexual outcomes such as increased pregnancies, STI risk, and negative sexual contact (Charlton et al., 2019, 2020; Coulter & Rankin, 2020; Goldberg et al., 2016; Paul Poteat et al., 2019). Therefore, one consequence of experiencing minority stressors may be an increased likelihood of sexual minority college students engaging in a variety of sexual behaviors related to negative

sexual health outcomes, as well as greater likelihood of experiencing such outcomes.

It is important to highlight that a large portion of research on sexual behaviors and outcomes in sexual minority populations has been conducted in adolescent and young adult populations broadly, with less attention on post-secondary students (Li et al., 2022). For instance, the research examining sexual health in sexual minority college students has not examined the full spectrum of possible outcomes or sexual orientation subgroups. For example, McGraw et al. (2020) examined contraceptive use, but not sexual activity while using substances or STI risk. Additionally, very few studies parse out findings by sexual orientation subgroups, or include information on less commonly endorsed identities (e.g., asexual). To fill in the gaps in the literature, more research needs to be done to evaluate whether differences exist between college sexual minority and heterosexual individuals regarding sexual behaviors and related outcomes.

Religion, Sexual Orientation, and Sexual Health

While examining the individual associations of sexual orientation and religiosity with sexual behaviors and outcomes in college students is important, equally important is examining the intersectional effects of these demographic factors. The associations of religiosity with sexual behaviors/outcomes may vary depending on one's sexual orientation. Given the reduced acceptance of sexual minority individuals within various religious communities (Twenge et al., 2016), religiosity may further contribute to minority stress experiences in some cases, which in turn can increase engagement in sexual behaviors that heighten risk of experiencing negative sexual health outcomes (Newcomb & Mustanski, 2011). As a result, religiosity may relate to sexual behaviors differently in sexual minority individuals as compared to individuals with a majority sexual orientation. For other health outcomes such as substance use and hypertension, for instance, several studies have shown that religion is not protective for the sexual minority community and is sometimes even harmful (Lamb et al., 2018; Rostosky et al., 2007, 2010). However, a recent meta-analysis reported that the effects of religiosity on sexual minority health broadly tend to be positive, especially in the context of intrinsic religiosity (e.g., a more personal connection to the Divine, as opposed to the organizational structures of religion) (Lefevor et al., 2021). While this meta-analysis did include some sexual health outcomes, most studies approached sexual health from an HIV-centric perspective (e.g., predominantly male samples, examining outcomes such as HIV testing or anal intercourse), and none of the studies examined college students specifically. Thus, it is important to examine the potentially unique role of religiosity in determining sexual health of sexual minority college students.

Though not in college students, one study found that sexual minority high school students living in communities in which religious denominations are less supportive of sexual minority individuals (i.e., Church of Jesus Christ Latter-Day Saints, Church of God in Christ, and Assemblies of God) tend to have a greater number of sexual partners compared to sexual minority living in communities with more supportive religious denominations (i.e., Unitarian/Universalists, Quakers, Presbyterian Church (USA), United Methodist Church, Episcopal, and Community of Christ) (Hatzenbuehler et al., 2012). Additionally, among sexual minority youth (not specific to college students), higher public religiosity (i.e., religious participation) is associated with lower likelihood of early age of sexual initiation in sexual minority men and women, but higher private religiosity (i.e., spirituality and internal religious feelings) was linked to higher likelihood of early age of initiation in sexual minority women (Goldberg & Halpern, 2017). Religious affiliation, on the other hand, appears to potentially have no effect on same-sex sexual initiation in sexual minority adults (Brewster et al., 2021). Given these religiosity and sexual health findings in sexual minority youth and adults vary from those seen in the general population, it is important to examine the way religiosity may differentially impact sexual behaviors for various sexual orientation groups.

The Current Study

As described above, very few studies were found that evaluated the interactions between religiosity, sexual minority status, and sexual behaviors/outcomes. No studies were found in the literature review that were specifically tailored to the college population with regards to the interaction between sexual health, sexual minority status, and religiosity. To address this, the current study aims to examine the associations between sexual behaviors and religiosity among college students of varying sexual orientations. Findings from the current study may inform the development of targeted sexual health intervention for religious college students of various sexual orientations. Given prior research, it was hypothesized that sexual minority identifying college students will report greater prevalence of engaging in sexual activity, engaging in sexual activity under the influence, and testing positive for an STI, as well as greater endorsement of failure to use birth control. Sexual minority college students will also report reduced prevalence of religious affiliation and lower levels of religiosity. It was also hypothesized that both religiosity and religious affiliation will be related to reduced endorsement of all sexual outcomes examined (i.e., sexual activity, use of birth control, sex under the influence, and testing positive for an STI). For sexual minority individuals specifically, it was

hypothesized that the strength of the associations between religiosity/religious affiliation and sexual behaviors/outcomes will be reduced (or non-significant) as compared to the associations observed in heterosexual college students.

Method

Participants and Procedure

Individuals were eligible to participate in the study if they met the following inclusion criteria: be 18 years of age or older, enrolled at least part time at a college or university in the state of Oregon, and have English literacy. Students were recruited via the SONA subject pool at Oregon State University, and with flyers and social media from the Oregon State University college community and other campuses in Oregon.

The data used in this study were collected as part of a larger study examining barriers and access to healthcare on college campuses (Conner et al., 2022). Participants completed an online Qualtrics survey for which they either received course credit, a \$5 Amazon gift card as compensation, or agreed to participate as volunteers. A total of $N = 2194$ individuals participated in the larger study.

Measures

Independent Variables

Sexual Orientation Students were asked to disclose their sexual orientation via the item “How do you describe yourself?” and provided the following answer options: straight, gay/lesbian, bi/pansexual, questioning, and other (asexual, demisexual, etc.). Individuals who selected “other” were asked to clarify their sexual orientation in a text box. Where possible, responses of “other” were later recoded and all responses were consolidated into the following categories: heterosexual (attraction to members of the opposite sex/gender), gay/lesbian (attraction to members of the same sex/gender), bi/pansexual (i.e., under the bisexual umbrella; attraction to individuals of all sexes/genders) (Flanders et al., 2016), questioning (feeling unsure about one’s sexual orientation), and asexual/other (lack of sexual attraction or endorsing a sexual orientation that does not fall into one of the other categories).

Religiosity Religiosity was assessed using the 15-item version of the Centrality of Religiosity Scale (CRS-15), which assesses salience of religious identity through 5 core domains: intellect, ideology, public practice, private practice, and experience (Huber & Huber, 2012). While the

measure is often delivered with items exclusively focused on either Western or Eastern religious traditions, both the polytheistic and monotheistic versions of Items 4, 5, 9, 10, and 14 (assessing private practice and experience) were presented to participants to be inclusive of multiple faith traditions. Respondents were instructed to answer those items that were most relevant to them. These were then combined into a single item, and the item with greater endorsement was used for participants who answered both items. During administration of the CRS-15, Items 3, 4, and 14 assessing frequency of prayer, meditation, and religious service attendance contain six (religious attendance, “never” to “more than once a week”) to eight (prayer and meditation, “never” to “several times a day”) Likert response options. Per scale development instructions, these items were recoded so that response options mapped onto the five Likert response options used in other frequency items (“never” to “very often”) (Huber & Huber, 2012). Scores from each item were then summed and averaged to create a total score. Higher scores indicate greater levels of religiosity. Overall, the scale showed adequate internal consistency ($\alpha = 0.95$). The CRS-15 was added to the survey after data collection had already begun. This led to 497 participants being excluded from the present analyses, as they did not have a chance to complete the measure.

Participant religious affiliation was also assessed with the following question: “What is your religious preference?” Response options included Protestant (Other Christian), Catholic, Mormon, Jewish, Muslim, another religion, agnostic, atheist, or no religion. Responses were then recoded into non-religious (agnostic, atheist, or no religion) and religious (Protestant, Catholic, Mormon, Jewish, Muslim, another religion). While the research team had intended to examine affiliative subgroup differences, these analyses ultimately could not be carried out because of the low endorsement of various affiliations by some of the sexual orientation subgroups. Rates of religious affiliation in the categories Protestant, Catholic, Other monotheistic, Polytheistic (e.g., Buddhism, Hindu, Pagan), Agnostic, and No religion/atheist are reported in the sample characteristics table (Table 1).

Dependent Variables

Sexual Activity Participants were asked if they had engaged in any recent sexual activity with the item: “Have you been sexually active within the last 6 months?” Response options to the item were “yes” or “no.”

Sexual Behaviors and Outcomes Participants were asked about the presence of various forms of sexual behaviors (i.e., failure to use birth control, sexual activity under the influence of substances) and outcomes (i.e., testing positive for an STI) in the past six months. Failure to use birth

Table 1 Sample characteristics of total sample and sexual identity subgroups

	Total sample	Heterosexual	Gay/lesbian	Bi/pansexual	Questioning ^a	Asexual/other ^a
<i>N</i>	1539 (100%)	1229 (79.86%)	41 (2.66%)	195 (12.67%)	44 (2.86%)	30 (1.95%)
Sex						
Male	385 (25.02%)	330 (26.85%)	17 (41.46%)	22 (11.28%)	9 (20.45%)	7 (23.33%)
Female	1154 (74.98%)	899 (73.15%)	24 (58.54%)	173 (88.72%)	35 (79.55%)	23 (76.67%)
Race/Ethnicity ^b						
White	1156 (75.11%)	902 (73.39%)	33 (80.49%)	160 (82.05%)	36 (81.82%)	25 (83.33%)
Black	41 (2.66%)	31 (2.52%)	1 (2.44%)	4 (2.05%)	3 (6.82%)	2 (6.67%)
AAPI	295 (19.17%)	264 (21.48%)	3 (7.32%)	20 (10.26%)	5 (11.36%)	3 (10.00%)
Hispanic	170 (11.05%)	137 (11.15%)	5 (12.20%)	20 (10.26%)	2 (4.55%)	6 (20.00%)
AIAN	44 (2.86%)	33 (2.69%)	0 (0.00%)	9 (4.62%)	1 (2.27%)	1 (3.33%)
Other	33 (2.14%)	22 (1.79%)	2 (4.88%)	7 (3.59%)	2 (4.55%)	0 (0.00%)
Unsure	5 (0.32%)	4 (0.33%)	0 (0.00%)	1 (0.51%)	0 (0.00%)	0 (0.00%)
Age in years						
18–20	1093 (71.02%)	891 (72.5%)	22 (53.66%)	129 (66.15%)	33 (75.00%)	18 (60.00%)
21–24	303 (19.69%)	223 (18.14%)	12 (29.27%)	50 (25.64%)	10 (22.73%)	8 (26.67%)
25–34	106 (6.89%)	84 (6.83%)	7 (17.07%)	12 (6.15%)	0 (0.00%)	3 (10.00%)
35–60	37 (2.40%)	31 (2.52%)	0 (0.00%)	4 (2.05%)	1 (2.27%)	1 (3.33%)
Sexual activity	1009 (65.56%)	797 (64.85%)	30 (73.17%)	145 (74.36%)	29 (65.91%)	8 (26.67%)
Failure to use birth control ^c	109 (10.80%)	68 (8.53%)	16 (53.33%)	21 (14.48%)	0 (0.00%)	4 (50.00%)
Sex under the influence ^c	458 (45.39%)	353 (44.29%)	16 (53.33%)	72 (49.66%)	15 (51.72%)	2 (25.00%)
Testing positive for an STI ^c	62 (6.14%)	44 (5.52%)	1 (3.33%)	16 (11.03%)	0 (0.00%)	1 (12.50%)
Religious affiliation						
Protestant	381 (24.76%)	354 (28.80%)	3 (7.32%)	18 (9.23%)	3 (6.82%)	3 (10.00%)
Catholic	236 (15.33%)	212 (17.25%)	1 (2.44%)	21 (10.77%)	2 (4.55%)	0 (0.00%)
Other monotheistic	64 (4.16%)	51 (4.15%)	1 (2.44%)	7 (3.59%)	3 (6.82%)	2 (6.67%)
Polytheistic	53 (3.44%)	33 (2.69%)	0 (0.00%)	16 (8.21%)	2 (4.55%)	2 (6.67%)
Agnostic	208 (13.52%)	129 (10.50%)	16 (39.02%)	41 (21.03%)	14 (31.82%)	8 (26.67%)
No religion/Atheist	597 (38.79%)	450 (36.62%)	20 (48.78%)	92 (47.18%)	20 (45.45%)	15 (50.00%)
Centrality of religiosity mean (SD)	2.46 (0.97)	2.53 (1.01)	2.00 (0.71)	2.20 (0.77)	2.29 (0.70)	2.27 (0.83)

N number of participants, *AAPI* Asian American and Pacific Islander, *AANI* American Indian/Alaskan Native, *STI* Sexually transmitted infection, *SD* standard deviation, *Age* in years

^aIndividuals identifying as questioning or asexual/other were excluded from statistical analyses due to low endorsement of outcomes

^bMore than one race/ethnicity identity could be selected, so total percentage does not equal 100%

^cTotal *N* and % is of the 1009 participants who reported sexual activity in the past 6 months (37 of which were excluded for identifying as questioning or asexual/other)

control during sexual activity was assessed by the item: “Did you or your partner(s) use any methods for birth control or disease prevention?” Engagement in sexual activity while under the influence of substances was assessed by: “Did you engage in sexual intercourse under the influence of drugs or alcohol?” Presence of an STI was assessed by: “Over the past six month, have you been told by a doctor, nurse, or other health professional that you had a sexually transmitted disease?” Response options to each item were “yes” or “no.” Participants were also asked whether any sexual activity in the past 6 months resulted in an unwanted

pregnancy; however, this item could not be examined due to its low endorsement ($n = 9$).

Relevant Covariates

Information on participants’ age, racial/ethnic identity, and biological sex was collected. Age was assessed using a Likert response format with the following categories: “18–20,” “21–24,” “25–34,” “35–60,” “61–75,” and “75 or older.” Responses to the biological sex item (“What sex were you assigned at birth, on your original birth certificate?”)

included “male,” “female,” “prefer not to say,” and “other, please specify.” Individuals that chose “prefer not to say” were excluded from analyses, and no individuals that selected “other” were included due to other reasons for exclusion (e.g., missing applicable data or ineligibility). Biological sex was used as a covariate as opposed to gender identity due to low rates of transgender and gender diverse identity being reported (< 5% of the sample). Because there was relatively small minoritized ethnic and racial subgroups in our sample, we were precluded from examining individual racial and ethnic groups. Instead, we chose to code the sample responses to the race/ethnicity item were dichotomized into two groups: non-Hispanic White and minoritized race/ethnicity.

Statistical Analyses

Analyses were conducted using SPSS 27 (IBM Corp, 2020). First, correlations between all variables of interest were examined. In order to test our first hypothesis that sexual minority identifying college students will report greater prevalence than heterosexual students of all sexual health outcomes and lower endorsement of religiosity and religious affiliation, Chi-square analyses were conducted for binary variables. An ANOVA was run to examine differences in religiosity between sexual identity subgroups. Tukey’s post hoc analyses were run when overall ANOVA was significant.

In order to test all subsequent hypotheses, moderation logistic regression models were examined using PROCESS (Hayes, 2018). When significant interactions were present, PROCESS conducted and reported simple slopes analyses, which estimated the conditional effect of religiosity/religious affiliation on sexual outcomes in various sexual orientation subgroups and then tested whether those conditional effects were different from zero (Hayes & Rockwood, 2017). The covariates age (treated as continuous) and race/ethnicity (binary variable) were included in all logistic regression models. To examine whether: (1) religiosity would be related to birth control use, sex under the influence, and testing positive for an STI for heterosexual students and (2) religiosity will be less salient for understanding sexual behaviors in sexual minority college students as compared to their heterosexual counterparts, three separate models were estimated with the occurrence of birth control use, sex under the influence, and positive STI test as the dependent variable. In these religiosity models, religiosity (as assessed via the CRS-15, which was mean-centered) and sexual orientation (a set of dummy-coded variables with heterosexual as the reference group compared to gay/lesbian or bisexual/pansexual) were the independent variables. The moderating role of sexual orientation on religiosity was examined by including a product term between religiosity and the sexual identity dummy-coded variables as predictors.

To examine whether: (1) religious affiliation (of any kind) would be related to birth control use, sex under the influence, and testing positive for an STI for heterosexual students and (2) it would be less salient for sexual minority individuals, three additional moderated logistic regression models were run with each of the sexual variables (birth control use, sex under the influence, and positive STI test) as the dependent variable. Given low cell size of sexual orientation subcategories who identified as religious, sexual orientation subcategories were combined in these religious affiliation models to compare heterosexual (referent) versus sexual minority individuals. Thus, the independent variables for the religious affiliation models were religious affiliation (assessed as religious vs non-religious) and sexual orientation (heterosexual vs sexual minority). The moderating role of sexual identity on religious affiliation was also examined.

For both religiosity and religious affiliation models examining sexual behaviors/outcomes (i.e., failure to use birth control, sex under the influence, and testing positive for an STI), individuals that did not endorse any sexual activity in the past 6 months were removed, given the intention is to examine these outcomes specifically among those engaging in sexual activity. Coefficients are reported in odds ratios with corresponding 95% confidence intervals. When including multicategorical interactions in PROCESS, likelihood ratio tests of highest order unconditional interactions (which indicate contribution of the interaction to the model) are provided. These are reported to provide information about whether or not the overall interaction is significant, and how this improves model fit.

All models were tested to determine whether the assumptions of multicollinearity (via examining variance inflation factor), linearity, and influence were met. It is possible that the data could violate the assumption of independence due to unmeasured nesting (e.g., participants enrolled at different Universities). This could affect the current study’s results by biasing standard errors; however, the findings in the current study are likely robust to this violation given that the majority of participants likely enrolled through SONA at Oregon State University. A single outlier was identified for each sexual behavior or outcome model, yet was found not to influence findings. All other assumptions were met.

Results

Of the 1697 participants who completed the survey after the CRS-15 was added, an additional 158 individuals were excluded for a variety of reasons including missing data, completing the survey too quickly (i.e., under 4 min), indicating that we should not use their data, or failing to meet eligibility criteria (as previously described in the method section). Demographic characteristics of the total sample of

1539 as well as the sexual orientation subgroups are reported in Table 1. Religious affiliation prevalence in the total sample (61.21%) was similar to trends observed in Oregon statewide (~69%), with the majority of participants identifying as Protestant or Catholic (Pew Research Center, 2022). Prevalence rates for the sexual behaviors/outcomes are only reported for individuals who have engaged in sexual activity in the past 6 months ($n = 1009$).

When examining reported prevalence for sexual outcomes by subgroup, it was revealed that both the questioning and asexual/other subgroups had low endorsement of some sexual behaviors/outcomes (failure to use birth control and testing positive for an STI; Table 1). Thus, individuals with a questioning or asexual/other identity ($n = 74$) were excluded from the logistic regression and chi-square analyses. Therefore, the final analytic sample for the sexual activity models was $n = 1465$ and $n = 972$ for the models examining sexual behaviors/outcomes in the sexually active subsample. Table 2 reports correlations for all variables of interest using the final analytic sample.

Sexual Orientation Differences in Sexual Behaviors, Religiosity, and Religious Affiliation

Chi-square analyses revealed some differences in sexual health based on sexual orientation when comparing heterosexual, gay/lesbian, and bi/pansexual college students. In the full sample ($n = 1465$), sexual orientation was significantly associated with differences in sexual activity ($\chi^2(2) = 7.70, p = .02$). Among individuals who engaged in sexual activity in the past 6 months ($n = 972$), sexual orientation was

significantly associated with failure to use birth control ($\chi^2(2) = 62.62, p < .001$), and testing positive for an STI ($\chi^2(2) = 6.80, p = .03$), but not having sex under the influence ($\chi^2(2) = 2.22, p = .33$). Heterosexual college students had the lowest rates of sexual activity and failure to use birth control. Gay/lesbian college students reported the highest rates of failure to use birth control and the lowest rates of testing positive for an STI. Bi/pansexual college students reported the highest rates of sexual activity and testing positive for an STI. The observed frequencies are reported in Table 1.

Analyses also revealed differences in religious affiliation and religiosity. Sexual orientation was significantly associated with differences in religious affiliation ($\chi^2(2) = 9.88, p = .007$). Heterosexual college students had the highest rates of religious affiliation (69.00%), then bi/pansexual college students (52.82%), and then gay/lesbian students (51.22%). Religiosity was also significantly different between sexual orientation subgroups ($F(2, 1462) = 14.41, p < .001$). Tukey’s post hoc analyses revealed that religiosity scores were significantly higher in the heterosexual group compared to the gay/lesbian group ($p = .002$) and compared to the bi/pansexual group ($p < .001$). Religiosity scores did not significantly differ between the two sexual minority subgroups ($p = .45$).

Religiosity, Sexual Orientation, and Sexual Health

The results of religiosity and sexual orientation interaction analyses are presented in Table 3. The likelihood ratio tests for the interactions in each model were as follows: failure to use birth control ($\chi^2(2) = 4.69, p = .09$); sex under the influence ($\chi^2(2) = 10.39, p = .006$); and testing positive for an STI

Table 2 Bivariate correlations for variables of interest

	1	2	3	4	5	6	7	8	9
1. Centrality of religiosity									
2. Religious affiliation	-.69***								
3. Sexual activity	-.17***	.09***							
4. Failure to use birth control ^b	.12***	-.04	-. ^d						
5. Sex under the influence ^b	-.05	.05	-. ^d	-.07*					
6. Testing positive for an STI ^b	.003	.02	-. ^d	-.02	.06				
7. Sexual minority status ^c	-.14***	.19***	.07**	.16***	.05	.07*			
8. Minoritized race/ethnicity ^c	.04	-.02	-.09***	.04	-.07*	-.01	-.07**		
9. Age	.01	.05*	.13***	.17***	-.02	.12***	.04	-.04	
10. Female	.07**	-.05*	.05*	-.07*	.03	.06*	.09***	-.02	-.06*

Correlation matrix excludes questioning and asexual individuals ($n = 1465$). Binary variables were coded such that 1 = any religious affiliation, engagement in sexual activity, failure to use birth control, engaging in sex under the influence of substances, testing positive for an STI, female sex assigned at birth

^bCorrelations reported here only include participants who endorsed past 6 month sexual activity ($n = 972$)

^cUsed binary variables to aid in interpreting correlations

^dCorrelations are 1, as sexual behavior items were only asked of individuals engaging in sexual activity

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 3 Results from religiosity multivariable logistic regression models (df = 8)

	Failure to use birth control ^a		Sex under the influence		Testing positive for an STI ^c	
	OR	95% CI	OR	95% CI	OR	95% CI
Religiosity X Gay/Lesbian	0.85	[0.28, 2.62]	0.22	[0.05, 1.01]	1.36	[0.09, 21.04]
Religiosity X Bi/pansexual	0.48*	[0.24, 0.95]	1.64*	[1.03, 2.61]	1.54	[0.73, 3.26]
Religiosity	1.93***	[1.48, 2.51]	0.87	[0.74, 1.01]	0.93	[0.69, 1.27]
Gay/lesbian ^b	16.44***	[6.45, 41.88]	0.72	[0.24, 2.17]	0.58	[0.08, 4.40]
Bi/pansexual ^b	2.42**	[1.37, 4.26]	1.23	[0.85, 1.77]	1.90*	[1.02, 3.52]
Age	1.76***	[1.38, 2.23]	0.93	[0.79, 1.10]	1.70***	[1.29, 2.25]
Sex	0.61	[0.37, 1.00]	1.16	[0.85, 1.58]	2.01	[0.92, 4.37]
Race/ethnicity	1.50	[0.96, 2.40]	0.73*	[0.56, 0.97]	0.99	[0.56, 1.74]
<i>Simple slopes</i>						
Heterosexual	1.93***	[1.48, 2.51]	0.87	[0.74, 1.01]	– ^d	–
Gay/lesbian	1.64	[0.55, 4.90]	0.19*	[0.04, 0.86]	–	–
Bi/pansexual	0.92	[0.49, 1.73]	1.42	[0.92, 2.20]	–	–

Binary variables were coded such that 1 = any religious affiliation, engagement in sexual activity, failure to use birth control, engaging in sex under the influence of substances, testing positive for an STI, female sex assigned at birth

df degrees of freedom, STI sexual transmitted infection, OR odds ratio, CI confidence interval

^aN = 972 for analyses

^bIndividuals identifying as asexual/other or questioning were excluded from analyses due to low endorsement of multiple outcomes

^cModel was rerun with non-significant interactions removed, the values above the line are the interaction term estimates from the original model and below the line are from the revised model without the interaction term

^dNo simple slopes reported due to lack of significant interaction effects

* $p < .05$, ** $p < .01$, *** $p < .001$

($\chi^2(2) = 1.28, p = .53$). There were eight degrees of freedom for all of the models. For heterosexual college students, religiosity was significantly associated increased odds of failure to use birth control (OR = 1.93, $p < .001$, 95% CI: [1.48, 2.51]), but not sexual activity under the influence or testing positive for an STI. Interactions revealed that bi/pansexual orientation moderated the association between religiosity and failure to use birth control (OR = 0.48, $p = .03$, 95% CI: [0.24, 0.95]), such that the relationships were not statistically significant for this subgroup (simple slopes are reported in Table 3). Bi/pansexual orientation also moderated the relationship between religiosity and sexual activity under the influence (OR = 1.64, $p = .04$, 95% CI: [1.03, 2.61]). Examination of simple slopes revealed that for heterosexual orientation, religiosity was related to decreased odds of sexual activity under the influence. For bi/pansexual orientation, religiosity related to increased odds of sexual activity under the influence; however, the simple slopes for each group were not statistically significant from 0. There were no significant interactions for gay/lesbian orientation meaning that the relationships between religiosity with failure to use birth control, sex under the influence, and testing positive for an STI did not statistically differ between heterosexual and gay/lesbian identifying students.

Given that the STI models had no significant interactions, the interaction terms were removed and the model was re-estimated. The corresponding coefficients are reported in Table 3. Religiosity (OR = 0.93, $p = .65$, 95% CI: [0.69, 1.27]) and gay/lesbian orientation (OR = 0.58, $p = .59$, 95% CI: [0.08, 4.40]) still had no association with testing positive for an STI, while bi/pansexual orientation was positively associated (OR = 1.90, $p = .04$, 95% CI: [1.02, 3.52]).

Religious Affiliation, Sexual Orientation, and Sexual Health

The results of the religious affiliation models are summarized in Table 4. Degrees of freedom for all models were $df = 14$. The likelihood ratio tests for the interactions in each model were as follows: failure to use birth control ($\chi^2(1) = 5.20, p = .02$); sex under the influence ($\chi^2(1) = 0.01, p = .89$); and testing positive for an STI ($\chi^2(1) = 0.42, p = .52$). For heterosexual college students, religious affiliation was significantly associated with increased odds of failure to use birth control (OR = 1.99, $p = .017$, 95% CI: [1.13, 3.49]), but not sexual activity under the influence or testing positive for an STI. Interactions revealed that sexual minority identity (excluding those identifying as questioning or asexual/other) moderated

Table 4 Results from religious affiliation multivariable logistic regression models (df = 6)

	Failure to use birth control ^a		Sex under the influence ^c		Testing positive for an STI ^c	
	OR	95% CI	OR	95% CI	OR	95% CI
Religious Affiliation X Sexual minority status	0.34*	[0.13, 0.87]	1.05	[0.54, 2.03]	1.48	[0.45, 4.94]
Religious affiliation	1.99*	[1.13, 3.49]	0.99	[0.77, 1.29]	1.06	[0.62, 1.82]
Sexual minority status ^b	5.99***	[2.97, 12.10]	1.24	[0.89, 1.72]	1.69	[0.93, 3.08]
Age	1.80***	[1.43, 2.27]	0.93	[0.79, 1.10]	1.69***	[1.28, 2.22]
Sex	0.55*	[0.34, 0.87]	1.12	[0.83, 1.51]	2.11	[0.98, 4.55]
Race/ethnicity	1.47	[0.95, 2.28]	0.74*	[0.56, 0.97]	0.98	[0.56, 1.74]
<i>Simple slopes</i>						
Heterosexual	1.99*	[1.13, 3.49]	– ^d	–	– ^d	–
LGB+	0.67	[0.32, 1.43]	–	–	–	–

Binary variables were coded such that 1 = any religious affiliation, engagement in sexual activity, failure to use birth control, engaging in sex under the influence of substances, testing positive for an STI, female sex assigned at birth

df degrees of freedom, *STI* sexual transmitted infection, *OR* odds ratio, *CI* confidence interval, *LGB+* lesbian, gay, bisexual, pansexual

^a*N* = 972 for analyses

^bIndividuals identifying as asexual/other or questioning were excluded from analyses due to low endorsement of multiple outcomes

^cModel was rerun with non-significant interactions removed; the values above the line are the interaction term estimates from the original model and below the line are from the revised model without the interaction term

^dNo simple slopes reported due to lack of significant interaction effects

p* < .05, *p* < .01, ****p* < .001

the association between religious affiliation and failure to use birth control (OR = 0.34, *p* = .024, 95% CI: [0.13, 0.87]), such that the relationship was not statistically significant for sexual minority college students (simple slopes; Table 4). There were no other significant interactions, meaning that the relations for religious affiliation and sex under the influence or testing positive for an STI did not differ for heterosexual and sexual minority college students.

Models without significant interactions were rerun, with coefficients reported in Table 4. Religious affiliation was no longer significantly associated with sex under the influence (OR = 0.99, *p* = .97, 95% CI: [0.77, 1.29]) or testing positive for an STI (OR = 1.06, *p* = .83, 95% CI: [0.62, 1.82]). Sexual minority identity was not significantly associated with sex under the influence (OR = 1.24, *p* = .21, 95% CI: [0.89, 1.72]) or testing positive for an STI (OR = 1.69, *p* = .08, 95% CI: [0.93, 3.08]) (Table 4).

Discussion

The current study examined the role of sexual orientation and religion in sexual health. It was found that sexual minority college students generally report greater prevalence of engaging in sexual activity and of engaging in sexual behaviors

that increase risk of experiencing unwanted sexual outcomes. Sexual minority college students are also less religious compared to their heterosexual counterparts. Religiosity was related to decreased sexual activity and use of birth control in the heterosexual and gay/lesbian subgroups. Religiosity was not related to sexual outcomes in the bi/pansexual group. Religious affiliation was also related to decreased sexual activity and use of birth control in the heterosexual subgroup; affiliation was related to decreased sexual activity for the sexual minority subgroup, but not related to birth control use.

The current study clarifies sexual orientation subgroup differences in sexual activity and behaviors that may heighten risk of experiencing negative sexual health outcomes. In particular, gay/lesbian prevalence of failure to use birth control was much higher than that of bi/pansexual college students (53.33% vs. 14.48%). While birth control's primary use is pregnancy prevention, it can also be used as an STI prevention tool, depending on the type of birth control method employed. Thus, given the very high rates of lack of birth control use in the gay/lesbian college student subsample, this may be a group uniquely at elevated risk of STI exposure. Conversely, gay/lesbian college students were also least likely to report recently testing positive for an STI. The discrepancy in these findings could reflect greater barriers for sexual minority students attempting to access sexual health

services (Conner et al., 2022). However, the item used to assess birth control use in the current study considered use for both pregnancy prevention and STI risk. Given different sexual identity subgroups likely use contraceptive methods for different reasons, these findings should be interpreted with caution. Future studies should include more comprehensive measures of contraception use to better understand patterns of use and how they related to sexual health across the sexual orientation spectrum. Even so, gay/lesbian college students may benefit from tailored sexual health education regarding birth control methods, highlighting the important of its use for STI prevention in addition to preventing pregnancy.

When examining the role of religiosity and religious affiliation on sexual health in the heterosexual subgroup, the results indicated both were associated with reduced birth control use in the last six months and reduced sexual activity. These findings support the literature identifying religion as a protective factor in heterosexual youth for engaging in sexual activity (Simons et al., 2009). Furthermore, while Koletic et al. (2021) found no evidence that religion is related to contraceptive use, they also highlighted the need for more research on this specific outcome. The current study seeks to help fill this gap by identifying that religion is related to reduced contraceptive use in heterosexual college students. Religious heterosexual college students who engage in sexual activity may be an important subgroup uniquely at elevated risk of low or ineffective contraceptive use during sexual activity.

Religious and sexually active heterosexual college student may experience low contraceptive use due to the negative messages about sex often communicated by religious communities (Hunt & Jung, 2009; Leonard & Scott-Jones, 2010), which could lead to less effective sexual health communication from parents during adolescence (Farrington et al., 2013) and greater levels of guilt and shame surrounding sexual activity (Cowden & Bradshaw, 2007). Less effective sexual health education and negative feelings related to sex may make it difficult for heterosexual college students to navigate sexual experiences and conversations, decreasing the likelihood of effective birth control use. In fact, studies have found that greater levels of religiosity are associated with lower levels of sexual self-efficacy in youth (Abbott et al., 2016; Rostosky et al., 2008). However, findings from the current study also suggest that the impact of religion on sexual behaviors and outcomes is not ubiquitous, as there was no association between religion with engaging in sexual activity under the influence or testing positive for an STI. Future studies would benefit from more complex designs and statistical models (e.g., longitudinal and structural equation modeling) in order to examine these possible mediating relationships and others.

The hypothesis that religiosity and religious affiliation would be less protective for sexual minority college students

as compared to their heterosexual peers for the examined sexual behaviors and outcomes was supported for certain outcomes and subgroups. For example, religiosity was not associated with birth control use for the bi/pansexual group; however, there were associations for this outcome in the heterosexual subgroup. These findings suggest that religiosity may not be a salient predictor of sexual behaviors in bi/pansexual college students. This lends support to the idea that religion as a broad construct is less relevant for understanding sexual minority sexual health than heterosexual sexual health.

There were exceptions to this idea that that religion is not associated with sexual outcomes in sexual minority subgroups. When sexual minority subgroups were parsed out, surprisingly the finding that religiosity was related to decreased sexual activity and birth control use was also observed in the gay/lesbian subgroup as in the heterosexual group. This suggests that there is relationship between religiosity and sexual outcomes in gay/lesbian college students. Furthermore, religiosity was significantly associated with reduced odds of sex under the influence for the gay/lesbian subgroup. It is important to note that there was not a significant interaction for religiosity and gay/lesbian orientation compared to heterosexual orientation; however, the comparison further highlights the different ways in which religion and sexual outcomes are related for gay/lesbian and bi/pansexual college students.

It is unclear why the pattern of findings differed for gay/lesbian and bi/pansexual college students, such that the role of religiosity on sexual outcomes was different for bi/pansexual students compared to heterosexual students, but was not different for gay/lesbian students compared to heterosexual students. It is possible that some of this is explained by greater statistical power for the bi/pansexual subgroup, which had a relatively larger subsample size. This would not explain all of the differences, however, as at times the direction of the associations differed. While we did not statistically compare these groups, the patterns could reflect differences between gay/lesbian and bi/pansexual college students in the salience of religiosity for understanding sexual outcomes. To explore these relationships more thoroughly, future projects should prioritize recruiting greater numbers of individuals across all sexual minority subgroups. Another possible explanation is that these groups have varying levels of religious affiliation and religiosity. However, this is adjusted for in the analysis with the included main effects of religious affiliation or religiosity in the corresponding model. Further, analyses exploring this possibility revealed that the gay/lesbian and bi/pansexual groups did not significantly differ on levels of religiosity. This suggests there may be other underlying differences in the experience/expression of religion across sexual orientation subgroups, and should be explored more thoroughly.

For example, bi/pansexual college students might be impacted differently by being raised in a religious household or identifying as religious experience. For instance, they could have different minority stress experiences in these contexts compared to gay/lesbian college students. If bi/pansexual college students experience more religiously based minority stress, they might be more likely than gay/lesbian college students to eschew their religious identities, weakening religion's association on health behaviors. Unfortunately, there is a paucity of research (both qualitative and quantitative) comparing the religious experiences of various sexual minority subgroups (Wilkinson & Johnson, 2020). These potential differences in religiosity across sexual minority subgroups and how they might relate to minority stress and various health outcomes should be explored further in future research projects. It will be important in future work to explore potential mechanisms that could explain why certain forms and experiences of religion are related to health outcomes differently depending on sexual orientation.

Limitations and Future Directions

There are a few key limitations of the current study. First, due to low endorsement of the sexual behaviors by questioning and asexual/other participants, these subgroups could not be examined in our analyses and therefore findings cannot be generalized to these groups. It is unsurprising that the asexual/other group had low endorsement of sexual behaviors and outcomes, given asexual orientation usually indicates less desire for sexual relationships. Even so, it is possible that asexual and questioning college students experience differential associations between religion and sexual outcomes, and future studies should consider this when designing their methodology. (More purposeful sampling methods of sexual minority college students can also allow for parsing out sexual orientation subgroups that have been combined [e.g., bisexual and pansexual].) Additionally, findings from the current study do not capture differences across various religious affiliations, due to small cell sizes within sexual minority subgroups. It is likely that differing religious affiliations are related to sexual outcomes in college students across sexual orientation subgroups in varying ways, attitudes toward sexual activity and sexual orientation vary across affiliations. Studies may benefit from purposeful and targeted sampling methods to obtain large enough subgroups so that a wide variety of sexual minority orientations and religious affiliations can be examined.

Another limitation of this study was the range of sexual behaviors and outcomes assessed was not all encompassing. First, the current study's conceptualization of birth control use was broad (i.e., pregnancy prevention and reducing STI risk). Not all negative sexual health outcomes related to reduced birth control use are relevant for all sexual

orientation subgroups (e.g., as pregnancy prevention for cis-gender women in exclusively same-sex sexual partnerships). Future research should include more comprehensive items to assess contraception use, specifically type used and reasons for using. This may help flesh out unique sexual health needs for various sexual orientation subgroups.

While the current study had the strength of including the behavior of engaging in sex under the influence, a variable that appears to be not often assessed in the established literature examining religion and sexual minority orientation, there were many other variables that could also be considered. For example, experiencing sexual violence is a negative sexual outcome especially relevant for sexual minority college students (Coulter & Rankin, 2020). In fact, sexual minority college women are also at greater risk of experiencing sexual violence as compared to heterosexual college women (Edwards et al., 2015), with heavy alcohol use a significant risk factor for sexual violence in sexual minority college students broadly (Johnson et al., 2019). It is possible that religion is associated with sexual violence outcomes across sexual orientation subgroups differently, and would be important to examine a possible risk or protective factor. Other relevant sexual health behaviors that could also be examined are number of sexual partners and type of sexual relationships. These variables would be especially relevant, given they could provide additional nuance into understanding sexual behaviors across sexual minority groups. The current study was secondary data analysis of a preexisting survey not specifically designed to examine sexual health; thus, the sexual behaviors and outcomes assessed were not comprehensive. More comprehensive measures should be included in future studies examining the role of religion and sexual orientation in sexual health.

While this study explored one type of minoritized identity, sexual minority orientation, it is possible that other minoritized identities (e.g., race/ethnicity, gender) relate to religion and sexual health. Not only should these identities be examined, but the possible intersections between other minoritized identities and sexual minority orientations should be explored as well. In particular, sex/gender should be examined in future research, as sexual behaviors, particularly use of birth control, differ based on this identity. While this study found that religiosity was a salient construct for understanding sexual outcomes in gay/lesbian college students, findings did not support this in the bi/pansexual subgroup. However, that is not to say that religion is never related to sexual health outcomes in bi/pansexual college students. It is possible that other intersecting identities may impact these associations, or lack of association, rather. For example, 8 in 10 African-Americans identify as Christian (Masci, 2018), meaning religiosity may also lead to unique associations with sexual health outcomes of African-American bi/pansexual college students as compared to White bi/pansexual college students.

Future research studies should consider approaching data collection and analyses from an intersectional perspective, recognizing that college student can have multiple identities that are a product of race, gender, sexual orientation, social status, etc., and that sometimes these identities can lead to individuals being doubly marginalized (Cole, 2009).

Clinical Implications

Findings from the current study highlight the variable ways religion can impact health behaviors. Given that failure to use birth control is related to increased likelihood of STI and unwanted pregnancy, heterosexual and gay/lesbian college students who are both religious and engaging in sexual activity are a group potentially at increased risk of experiencing negative sexual health outcomes compared to other college students. Both religious and sexually active heterosexual and gay/lesbian college students could potentially benefit from increased sexual health education (Martin et al., 2018), or tailored messaging that specifically addresses their sexual health needs (Clark & Stitzlein, 2016; Marcinechová & Záhorcová, 2020). However, given many religious group's doctrines promoting exclusively monogamous sexual activity, there are likely unique barriers that need to be considered before developing and delivering sexual health messaging to religiously identified college students of various sexual orientations. Future studies, both qualitative and quantitative, could aid in the discovery of specific barriers, which in turn could help inform intervention and education efforts.

Conclusions

Findings from the current study show that religion is a salient construct for understanding sexual behaviors and outcomes in heterosexual and gay/lesbian college students, but not in bi/pansexual college students. Given that religion has differential effects for various sexual behaviors and outcomes, it is important that sexual health messaging on college campuses not only increase for religiously identified college students, but that the messaging should also be tailored to those students' specific needs. Additional research is needed to further inform sexual health education efforts for religiously identified college students.

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Availability of Data and Material All the data and materials are available upon request.

Declarations

Ethical Approval and Informed Consent This study was approved by Oregon State University Institutional Review Board, and approval was

sought as required by the review boards of other campuses in which the recruitment took place.

Conflicts of interest The authors declare that they have no conflict of interest.

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