

ASSOCIATION BETWEEN SEXUAL EDUCATION AND RISKY SEXUAL BEHAVIOR  
AMONG COLLEGE STUDENTS

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## ABSTRACT

### ASSOCIATION BETWEEN SEXUAL EDUCATION AND RISKY SEXUAL BEHAVIOR AMONG COLLEGE STUDENTS

by Amy M. VanMullekom

Formal sexual education has been shown to have an impact on adolescent sexual behavior. Although this relationship during adolescence has been looked at extensively, the influence of formal sexual education into the college years has not been examined as closely. This study examined the differences in sexual values and risky sexual behavior in the first two years of college from freshmen and sophomores who previously had either comprehensive or abstinence-only sexual education. An online survey was completed by 997 undergraduate students at a Midwestern university. The results showed that although the groups differed on sexual values, there were no practical significant differences in risky behavior between sexual education groups. Implications from this study indicate continuation of sexual education into the college years would be beneficial.

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## **Introduction**

Youth aged 15-24 years are at the highest risk of acquiring sexually transmitted infections (STIs) and account for nearly half of all new STI cases each year (Centers for Disease Control and Prevention [CDC], 2012; Weinstock, Berman, & Cates, 2004). Among industrialized nations, the United States ranks the highest in teenage birth rate (Darroch, Singh, & Frost, 2001; McKay & Barrett, 2010; UNICEF, 2001). According to the CDC (2011), the teenage birth rate (age 15 – 19) was 39.1 per 1,000 women which was between one and a half and nine times higher than any other developed countries. STIs can pose potential long-term health risks to those infected and can lead to infertility. There is a significant amount of research showing the vast potential negative outcomes for teenage mothers and their children (such as, Cornelius et al., 2009; East, Reyes, & Horn, 2007; Hanna, 2001; Lipman, Georgiades, & Boyle, 2011). Additionally, limited research on teenage fathers (Fletcher & Wolfe, 2012; Mollborn & Lovegrove, 2011; Thornberry, Smith, & Howards, 1997) has shown many negative outcomes as well. In their decade review, Crosnoe and Cavanagh (2010) found that adolescents who have children often attain lower education and occupational outcomes, are less likely to marry, and have children with negative social, academic, and psychological outcomes.

There are several highly researched risk factors for STIs and unintended pregnancy. One of those risk factors is increased number of sexual partners (Kuortti & Kosunen, 2009; Santelli, Brener, Lowry, Bhatt, & Zabin, 1998; van Rood, Dickson, Sharples, & Paul, 2012). Luster and Small (1994) found that both males and females with multiple sexual partners were less likely to use contraception than their counterparts with fewer sexual partners. Additional risk factors include limited or incorrect condom usage (French & Holland, 2013; Lewis, Malow, & Ireland, 1997) and being under the influence of alcohol (Cooper, 2002). The American College Health

Association (ACHA, 2013) found that only 50.3% of sexually active college students reported consistent condom usage. There are many sources in adolescent and young adults' lives that have an impact on their sexual values and behaviors, including, parents (Byers, 2011; Robert & Sonenstein, 2010), peers (Bleakley, Hennessy, Fishbein, & Jordan, 2009), and formal sexual education (Kirby, Laris, & Rolleri, 2007). Formal sexual education can play an important role in the reduction of risky sexual behaviors and their negative outcomes (Kirby, 2007; Lindberg & Maddow-Zimet, 2012).

There are an abundance of studies examining the effectiveness of formal sex education among adolescents. Kirby (2007) examined 54 studies on formal sexual education and found adolescents who received abstinence-only sexual education had neither delayed sexual onset nor reduced risky sexual behaviors. Additional consequences for adolescents receiving abstinence-only sexual education include important gaps in knowledge of STIs (Trenholm et al., 2008), less positive attitudes toward contraception (McGuire, 2005), and a reduction in condom use (Borawski, Trapl, Lovegreen, Colabianchi, & Block, 2005). Kirby (2007) concluded that the most well-designed and intensive abstinence-only programs did not change behaviors with the exception of one reviewed study that found a short delay in sexual initiation among middle school students (see Denny & Young, 2006). Alternatively, other studies illustrate comprehensive sexual education can have a positive effect on a number of areas of concern (e.g., delaying sexual intercourse, reducing number of partners, reducing frequency of sexual intercourse, increasing condom and contraceptive use; Kirby, 2007). A counterargument often used against comprehensive sexual education is that it will result in earlier sexual initiation and increased promiscuity among adolescents, which has not been found through empirical evidence (Kirby, 2007; Lindberg & Maddow-Zimet, 2012).

There has been a vast amount of research that has shown the beneficial behavioral outcomes of formal sexual education (Kirby, 2007; Kirby et al., 1994; Kirby et al., 2007; Lindberg & Maddow-Zimet, 2012). Although this relationship during adolescence has been looked at extensively, the influence of formal sexual education into the college years has not been examined as closely. The purpose of this study was to explore the influence of formal sexual education into the first two years of college through the measurement of self-reported sexual values and risky sexual behavior. The differences in sexual values and risky sexual behaviors were analyzed based upon the type of sexual education the respondents received.

### **Literature Review**

Sexual education and risky sexual behaviors have been heavily researched. The two primary sexual education models in the United States (abstinence-only and comprehensive) are first examined. Next, multiple sexual partners, the influence of alcohol use, and condom usage will be examined in relation to risky sexual behaviors. In addition, the limited research on sexual values and their relationship with behaviors will be assessed. Finally, the current research covering the influence of sexual education on sexual behavior for young adults will be reviewed.

### **Sexual Education**

Formal sexual education offered in the United States education system often comes in one of two forms: comprehensive sexual education (sometimes called abstinence-plus) or abstinence-only sexual education (sometimes called abstinence-until-marriage). In 2004, National Public Radio, the Kaiser Family Foundation, and Harvard University jointly conducted a random nationally representative poll that found only 7% of Americans thought sexual education should not be taught in schools (Kaiser Family Foundation, 2004). Public opinion has largely supported comprehensive sexual education with 82% of a nationally representative

sample in favor, 8% with no opinion, and only 10% opposing (Bleakley, Hennessy, & Fishbein, 2006). Lindberg and Maddow-Zimet (2012) found that both abstinence-only and comprehensive sexual education helped reduce risky sexual behaviors compared to respondents who had received no formal sexual education.

Formal sexual education in the United States, whether comprehensive or abstinence-only, varies by state, school, and even classroom (Landry, Darroch, Singh, & Higgins, 2003). According to the Guttmacher Institute (2014), only 22 states and the District of Columbia (DC) mandate sexual education and 33 states and DC mandate HIV education. Although sexual education is not mandated in other states, if it is taught, 37 states require abstinence to be included and of those 25 require that it is stressed. Only 13 states require the programs to be medically accurate. For example, in the state of Michigan, sexual education is not mandated, but when it is provided it must stress abstinence, importance of sexual intercourse within marriage, and negative outcomes of teenage sexual intercourse. However, in New Mexico, sexual education is mandated and must cover abstinence and include information on contraception and be inclusive of sexual orientation (Guttmacher Institute, 2014).

Effective sexual education programs are based in theory. Kirby (2007) examined the quality of 83 sexual education programs and found that 83% of the programs were theory based with social learning theory being the most prevalent (54%). Kirby (1994) found social learning theories to be the most effective for developing sexual education programs based on the use of knowledge, motivation, outcome expectancy, self-efficacy, and societal pressures. Consistent with Kirby, Weiser and Miller's (2010) review found that individual sexual self-efficacy is highly predictive of sexual behaviors including attitudes toward contraception. Self-efficacy is defined as belief in one's own abilities to complete tasks and/or goals (Bandura, 1977). Based on

the premise of social learning theory and self-efficacy, effective sexual education programs should not only provide information about safe sexual practices, but also include instructional exercises on contraceptives, barrier methods, and sexual communication skills (Bandura, 1977; Somers, Johnson, & Sawilowsky, 2002).

**Abstinence-only sexual education.** Abstinence-only sexual education was first funded during the Reagan administration in 1981 (Boonstra, 2009). The federal funding guidelines (U.S. Department of Health & Human Services, 2013) indicate Abstinence-only programs must:

1. Have as its exclusive purpose, teaching the social, psychological, and health gains to be realized by abstaining from sexual activity.
2. Teach abstinence from sexual activity outside marriage as the expected standard for all school age children.
3. Teach that abstinence from sexual activity is the only certain way to avoid out-of-wedlock pregnancy, sexually transmitted diseases, and other associated health problems.
4. Teach that a mutually faithful monogamous relationship in the context of marriage is the expected standard of human sexual activity.
5. Teach that sexual activity outside of the context of marriage is likely to have harmful psychological and physical effects.
6. Teach that bearing children out-of-wedlock is likely to have harmful consequences for the child, the child's parents, and society.
7. Teach young people how to reject sexual advances and how alcohol and drug use increases vulnerability to sexual advances.
8. Teach the importance of attaining self-sufficiency before engaging in sexual activity.

With the increased financial support from federal and state agencies, abstinence-only sexual education programs dramatically increased in US school systems between 1996 and 2006 (Boonstra, 2009; Lindberg, Santelli, & Singh, 2006). The Kaiser Family Foundation (2004) reported that approximately 30% of the schools were teaching abstinence-only even though two decades of research have not illustrated evidence of effectiveness (Kirby, 2002; Santelli et al.,

2006; Trenholm et al., 2008). Funding for abstinence-only education was set to expire in 2009; however, \$250 million was allocated for abstinence-only education in 2010 as part of the health care reform law (Landau, 2010). Although some funding was restored through the healthcare reform, previous program funding of \$112 million was cut from the Adolescent Family Life prevention program (AFL) and Community-Based Abstinence Education (CBAE) programs as part of the push towards evidence-based sexual education programs (Sexuality Information and Education Council of the United States [SIECUS], 2009). President Obama has made it clear that funding needs to be directed at effective evidence-based sexual education programs and pregnancy prevention programs (SIECUS, 2009; Weiser & Miller, 2010).

**Comprehensive sexual education.** The guidelines for comprehensive sexual education programs vary throughout the education system. The Responsible Education About Life Act was introduced in the U.S. Senate in 2007 and again in 2009, both times being referred back to the Senate Committee on Health, Education, Labor, and Pensions for revisions. The Responsible Education about Life Act of 2009 provided guidelines that federally funded comprehensive sexual education should entail that it:

1. Is age appropriate and medically accurate.
2. Stresses the value of abstinence while not ignoring those young people who have had or are having sexual intercourse.
3. Provides information about the health benefits and side effects of all contraceptive and barrier methods used:
  - a. as a means to prevent pregnancy and
  - b. to reduce the risk of contracting sexually transmitted disease, including HIV/AIDS.
4. Encourages family communication between parent and child about sexuality.
5. Teaches young people the skills to make responsible decisions about sexuality, including how to avoid unwanted verbal, physical, and sexual advances and how to avoid making verbal, physical, and sexual advances that are not wanted by the other party.

6. Develops healthy relationships, including the prevention of dating and sexual violence.
7. Teaches young people how alcohol and drug use can affect responsible decision making.
8. Does not teach or promote religion.

The SIECUS (2004) guidelines for K-12 comprehensive sexual education state, “people have the right to comprehensive sexuality education that addresses socio-cultural, biological, psychological, and spiritual dimensions of sexuality providing information; exploring feelings, values, and attitudes; and developing communication, decision-making, and critical-thinking skills” (p. 13). The guidelines cover six key concepts: human development, relationships, personal skills, sexual behavior, sexual health, and society/culture. Everything taught must be age appropriate, medically accurate, and evidence-based. Although these are two examples of concepts and structure to comprehensive sexual education, the programs do vary within the education system with some programs being more effective than others. Overall, Kirby (2007) found comprehensive sexual education programs in comparison to abstinence-only programs to be beneficial in delaying sexual onset and reducing frequency of sexual intercourse, pregnancy rates, STIs, and number of sexual partners.

### **Risky Sexual Behavior**

A major component of sexual education is to reduce risky sexual behaviors as a way to improve health and life outcomes for adolescents and young adults (SIECUS, 2004). Risky sexual behaviors are often defined as any purposeful sexual behaviors that put an individual at risk for STIs/HIV or unintended pregnancy. Risky sexual behaviors can be examined by several factors including multiple partners, alcohol use, and condom usage.

**Multiple sexual partners.** There has been a considerable amount of research looking at multiple sexual partners as a sexual risk factor (Kuortti & Kosunen, 2009; Santelli et al., 1998;

van Rood et al., 2012). Valois, Oeltmann, Waller, and Hussey (1999) found that increased number of sexual partners was correlated with an increased risk for unintended pregnancy and STIs. In 2010, approximately 3.9% of men and 1.8% women (age 15 - 44) had had five or more opposite-sex sex partners. The 15-24 year olds accounted for the largest portion of the nationally representative sample with five or more sex partners (Chandra, Billioux, Copen, & Sionean, 2012). Forhan et al. (2009) analyzed data from females in a national health survey and found that the prevalence of any STI for females aged 14 to 15 was 14.1% and by age 18 to 19 the prevalence rate significantly increased to 33.8%. The prevalence of STIs among women who had three or more sexual partners increased to 53.5% compared to 19.7% for women who had only one sexual partner. The increased prevalence of STIs for individuals with greater number of sexual partners may be explained by the association between reductions in contraceptive and barrier use with increased number of sexual partners (Kuortti & Kosunen, 2009). These findings have strongly suggested that multiple sexual partners are a strong factor associated with risky sexual behavior.

**Influence of alcohol.** The effects of alcohol on judgment and decision-making have long been documented (George, Rogers, & Duka, 2005; Steele & Josephs, 1990). George et al. (2005) found that alcohol use impaired decision making skills due to inability of those intoxicated to accurately assess the cost and benefits associated with risky behaviors. A meta-analysis of alcohol consumption and HIV infection studies found that alcohol consumption was strongly associated with increased risk of HIV infection with binge drinkers (i.e., four or more drinks in two hours for females and five or more drinks in two hours for males) at double the risk of infection compared to non-binge drinkers (Baliunas, Rehm, Irving, & Shuper, 2010). Cooper (2002) performed an extensive review of 30 studies using random samples that had been

published in the past 10 years that looked at alcohol use and risky sexual behaviors among college students. The use of alcohol was strongly related to both the decisions to engage in sexual relations and for having multiple partners and casual sexual intercourse. Also, among younger individuals, they found the use of protective barriers (e.g., condoms) decreased with use of alcohol.

**Condom usage.** Condoms can be a very effective method of STI and pregnancy protection as they are easily accessible and low cost. A decade review (Lewis et al., 1997) found that college students did not use condoms consistently even though they can greatly reduce STI/HIV transmission. Studies from the review found in some cases only 23% of the college students used a condom always or almost always and another found 37% of their sample never used a condom and approximated 67% used a condom fewer than half of the times they had sexual intercourse. From the studies reviewed, a range of 15-25% of students used a condom every time they had casual sexual intercourse. Lewis et al. (1997) also found that as number of sexual partners increased, the use of condoms decreased. There were several barriers found that reduced condom usage, including the belief that condoms reduced pleasure and embarrassment about purchasing condoms. Other barriers were difficulty communicating with sexual partners about condom use and limited knowledge that condoms can help reduce STIs. College students often have a low sense of self-efficacy when it comes to condom use which may result in condoms not being used. Education on safer sex alone does not translate into condom usage; rather, instructional exercises and effective partner communication skills are necessary to ensure individuals believe they are able to use condoms (Bandura, 1990). Research also showed that those more approving of sexual behavior were also more likely to use a condom due to preparedness (Lewis, Granato, Blayney, Lostutter, & Kilmer, 2012).

## **Sexual Values**

Values represent what is important in a person's life with some values holding higher importance than others (Bardi & Schwartz, 2003). They often represent a sense of right and wrong. Sexual values are often measured by asking questions about pre-marital sexual intercourse, casual sexual intercourse, and general openness towards various sexual behaviors. Richey, Knox, and Zusman (2009), state that sexual value groups are often defined by three categories: absolutism (abstinence-until-marriage), relativism (decisions are made in context of relationships and environment), and hedonism (if it feels good, do it). Richey et al. (2009) found that the majority of their college student respondents belonged to the relativism category (62.1%) followed by hedonism (24.6%). Bardi and Schwartz (2003) state there are mixed findings when looking at the impact values have on behavior with some research showing values guide behavior and others finding they rarely guide behavior and only for certain types of people. The exact relationship between values and behaviors is still unclear with many contradictory findings.

There is limited research examining sexual values of young adults (Morgan & Zubriggen, 2012; Richey et al., 2009; Wetherill, Neal, & Fromme, 2010). Wetherill et al. (2010) found that college students with more conservative sexual values were associated with less risky sexual behavior (e.g., fewer sexual partners, less frequent unsafe sexual behaviors) and those with liberal sexual values were associated with increased sexual frequency. However, when looking at values and behavior, Bardi and Schwartz (2003) point out that even though a behavior may oppose a person's own values, people may still conform to the normative behavior. Their research supported the idea that highly normative behaviors are weakly associated with the values they express. Additionally, Morgan and Zurbriggen (2012) found that sexual values

changed from the first year of college to the second with the increased acceptance of casual sex over time. As sexual intercourse in college is viewed as a highly normative behavior by many college students (Arnett, 2000; Garcia, Reiber, Massey, & Merriwether, 2012), Bardi and Schwartz's (2003) findings would suggest college students' sexual values may be weakly associated with their sexual behaviors.

### **Sexual Education and Risky Sexual Behavior in College**

The association between sexual education and risky sexual behavior has been heavily researched among adolescents. However, there has been limited research examining this relationship among college students (Lindberg & Maddow-Zimet, 2012; Walcott, Chenneville, & Tarquini, 2011). Lindberg and Maddow-Zimet (2012) found that young adults who received abstinence-only education were nearly indistinguishable in sexual behaviors from those who received comprehensive sexual education; however, one admitted limitation to their study was the measurement of type of sex education. Sexual education groups were derived from multiple questions (i.e, not directly measured) from the National Survey of Family Growth. The question that determined the comprehensive group was whether respondents had learned about birth control; however, it was unknown if the message they received about birth control was negative or positive, which may have led to an incorrect decision on which type of sexual education was received. Walcott et al. (2011) focused on college students by measuring risky sexual behavior with two questions examining condom use in the past two years and past two weeks on a five point likert scale ranging from never to always. This study also found no significant relationship between formal sexual education and sexual behaviors in regards to condom use. Overall, there is limited research examining the influence of sexual education on sexual behaviors of college studies, with the available studies containing severe limitations.

Therefore, this study further explored the influence of formal sexual education (abstinence-only or comprehensive) into the first two years of college through measurement of self-reported sexual values and risky sexual behavior. Based on the literature, we expected to find differences in sexual behaviors between sex education groups. As research has shown adolescents benefit more from comprehensive sexual education compared to abstinence-only, it was expected that this differential outcome continued into the college years. We also expected to find that college students who received comprehensive sexual education engaged in less risky sexual behaviors than those who received abstinence-only education.

## **Method**

### **Participants**

The complete data set contained 1687 undergraduate students from a Midwestern university. For the purpose of the current study, only non-married freshman and sophomore students, 18-20-years-old, were included. The resulting sample was 997 freshmen and sophomore college students (See Table 1). To get a better picture of the initial period of entering college for a traditional student, the exclusion of upper classmen and married respondents was decided. This was also done to help reduce recall error for type of sexual education received (Eisenhower, Mathiowetz, & Morganstein, 2004) by limiting the time between received sexual education and completion of the survey. There were 754 female (75.6%) and 243 male (24.4%) respondents. The sample was primarily Caucasian (87.9%) with African American being the next largest group (7.3%) which is similar to the overall university racial make-up (Caucasian, 81%; African American, 5%). Respondents ranged in age from 18 to 20-years-olds, (18-year-olds = 57%, 19-year-olds = 33.2%, 20-year-olds = 9.8%) and were primarily freshmen (71.1%). A total of 750 respondents (75.2%) reported having received comprehensive sexual education. The high

prevalence of comprehensive sexual education was shared by females ( $n = 553$ , 73.3%) and males ( $n = 197$ , 81.1%). The majority of respondents ( $n = 713$ , 71.5%) reported having engaged in sexual intercourse.

Table 1

*Demographic Characteristics of Sample*

Characteristic	Abstinence-Only Model ( $n = 247$ )		Comprehensive Model ( $n = 750$ )		Total Sample ( $n = 997$ )	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
<b>Sex</b>						
Female	201	81.4	553	73.7	754	75.6
Male	46	18.6	197	26.3	243	24.4
<b>Race/Ethnicity</b>						
Caucasian	220	89.1	656	87.5	876	87.9
African American	17	6.9	56	7.5	73	7.3
Hispanic	4	1.6	12	1.6	16	1.6
Asian	3	1.2	7	0.9	10	1.0
Other	3	1.2	18	2.4	21	2.1
<b>Grade Level</b>						
Freshmen	186	75.3	523	69.7	709	71.1
Sophomore	61	24.7	227	30.3	288	28.9
<b>Age</b>						
Eighteen	142	57.5	426	56.8	568	57.0
Nineteen	78	31.6	253	33.7	331	33.2
Twenty	27	10.9	71	9.5	98	9.8
<b>Secondary Education</b>						
Public	186	75.3	682	90.9	868	87.1
Private	52	21.1	48	6.4	100	10.0
Other	9	3.6	20	2.7	29	2.9
<b>Sexual Intercourse</b>						
Yes	174	70.4	539	71.9	713	71.5
No	73	29.6	211	28.1	284	28.5

**Design**

This study examined previously collected data from a mixed method online survey taken by students enrolled in an introductory human development course from 2011-2012. The use of

online surveys has been shown to be an effective method when dealing with sensitive self-report topics (e.g., sexual behavior; Daley, McDermott, Brown, & Kittleson, 2003; Supple, Aquilino, & Wright, 1999). Respondents received extra credit for completing the survey which has been shown to increase response rate (Cobanoglu & Cobanoglu, 2003; Evans & Mathur, 2005). Although the survey was anonymous, after completing the survey respondents were linked to a separate survey to input their name to receive extra credit and control for multiple responses (Birnbaum, 2004) and malicious intent (Kraut et al., 2004). The survey covered a multitude of topics including self-report of sexual behaviors, parental and peer influence, and sexual attitudes, behaviors, and beliefs with a mixture of open-ended questions and standard likert scales.

## **Measures**

**Sexual education.** The independent variable, sexual education, was measured by the following question: “What kind of sexual education did you receive in your school?” Participants could respond with one of four options: An abstinence model (focused on preventing sexual behavior; coded 1), A comprehensive model (focused on abstinence and safe sexual behavior; coded 2), don’t remember, and none.

**Sexual values.** The sexual values questions (“If a couple has sex before marriage, do you think it is:”; “Casually hooking-up (sex) between college students is:”) were measured on a four point likert scale [(always wrong (1), almost always wrong (2), wrong only sometimes (3), not wrong at all (4)].

**Sexual intercourse.** Respondents were asked: “Have you ever had sexual intercourse?” Yes (1) or No (2).

**Pregnancies.** Respondents were asked: “How many times have you been pregnant or gotten someone pregnant?” and were able to indicate a specific number.

**Sexually transmitted infections (STIs).** Respondents were asked: “How many of the following sexually transmitted diseases or infections have you had in the past year?” (check all that apply). The responses to select were: I have never had an STI, Crabs, Syphilis, Chlamydia, Gonorrhea, herpes, Human Papilloma Virus (genital warts), Hepatitis, HIV, other. Respondents were also asked: “Have you ever been tested for a sexually transmitted disease or infection (including HIV)?” Yes (1) or No (2).

**Number of sexual partners.** Respondents were asked: “Approximately how many sexual partners have you had during college?”; “During the past 3 months, with how many people have you had sexual intercourse?” and both questions were answered by indicating a specific number.

**Influence of alcohol or drugs.** Respondents were asked: “What percentage of the times that you had sex over the past 3 months would you consider yourself under the influence of alcohol and/or drugs?” and were able to indicate a specific percentage.

**Condom usage.** Respondents were asked: “How often have you used a condom during college?” which was answered by a five point likert scale [always (1), frequently (2), every now and then (3), rarely ever (4), never (5)]. They were also asked: “What percentage of times that you had sex over the past 3 months did you use a condom?” and were able to indicate a specific percentage. An additional question asked: “The last time you had sex, did you or your partner use a condom?” Yes (1) or No (2).

## **Results**

An independent samples *t*-test was used to analyze mean differences in sexual values and risky behavior between the two sexual education groups. The 997 respondents were analyzed for sexual values and if they had ever had sexual intercourse. For the questions regarding sexual

behavior, only the 713 respondents with sexual experience were analyzed. Using a post hoc power analysis with a small effect size ( $ES = .20$ ),  $p = .05$ , and  $n = 713$ , statistical power determined by using G\*power is 0.63 which is considered medium-high (Cohen, 1992; Erdfelder, Faul, & Buchner, 1996).

### **Sexual Values and Sexual Intercourse**

There was a significant mean difference between groups on attitudes about sexual intercourse before marriage,  $t(976) = -3.07$ ,  $p = .002$ ,  $d = .20$ , and casual sexual intercourse between college students,  $t(976) = -2.81$ ,  $p = .005$ ,  $d = .18$ , indicating respondents who received abstinence-only education were more likely to respond that “sexual intercourse before marriage” and “casual sexual intercourse between college students” was always wrong (See Table 2). However, respondents were equally likely to have ever engaged in intercourse regardless of receiving an abstinence-only (70.4%) or a comprehensive education (71.9%). There were no significant differences between sexual education groups for either sex based on intercourse behavior. For females, 70.6% who received abstinence-only reported engaging in sexual intercourse compared with 70.1% of females who received comprehensive,  $t(752) = -.13$ ,  $p = .90$ ,  $d = .01$ . For males, 69.7% from abstinence-only group reported engaging in sexual intercourse compared with 76.6% from the comprehensive group,  $t(241) = 1.00$ ,  $p = .32$ ,  $d = .13$ .

Table 2

*Group Comparison of Sexual Values and Sexual Intercourse*

Variable	Abstinence-Only Model ( <i>n</i> = 247)		Comprehensive Model ( <i>n</i> = 750)		<i>p</i>
	<i>f</i>	%	<i>f</i>	%	
Pre-Marital Sex					.002*
Always wrong	16	6.6	28	3.8	
Almost always wrong	18	7.4	30	4.1	
Wrong only sometimes	70	28.8	191	26.0	
Not wrong at all	139	57.2	486	66.1	
Casual Sex					.005*
Always wrong	59	24.3	123	16.7	
Almost always wrong	60	24.7	161	21.9	
Wrong only sometimes	84	34.6	310	42.2	
Not wrong at all	40	16.5	141	19.2	
Sexual Intercourse					0.67
Yes	174	70.4	539	71.9	
No	73	29.6	211	28.1	

Note . \**p* < .05.

**Pregnancies**

There were no significant differences based on sexual education for the number of pregnancies (self or partner),  $t(271) = -1.10, p = .27$ . The abstinence-only group ( $M = .06, SD = .26$ ) had slightly more pregnancies than the comprehensive group ( $M = .03, SD = .23$ ), but it did not reach statistical significance.

**Sexually Transmitted Infections and Testing**

The type of sexual education had no statistically significant difference in the likelihood of acquiring an STI in the past year. Only 16 respondents (2.2%) reported having acquired an STI in the past year. Seven of these came from the abstinence-only education group (6 females, 1

male) and nine were from the comprehensive education group (7 females, 2 males). The majority of respondents (60.3%) reported they had never been tested for an STI/HIV. There were no significant differences between the abstinence-only (61.7% of females and 81.3% of males) and the comprehensive group (53.2% of females and 74.2% of males) for having not been tested for STIs,  $t(706) = 1.53, p = .13, d = .12$ . As it is likely some respondents have an undiagnosed STI, the following analyses examined behaviors contributing to the likelihood of acquiring one.

### **Number of Sexual Partners**

There was a significant mean difference between the sexual education groups for number of sexual partners during college,  $t(506) = -2.31, p = .02$ , indicating those in the abstinence-only group ( $M = 1.52, SD = 1.37$ ) had fewer sexual partners than those in the comprehensive group ( $M = 1.86, SD = 2.34$ ); however, Cohen's  $d$  indicated the effect size was minimal,  $d = .21$ , making them lack practical significance (See Table 3). When examining each sex independently, the significant mean difference between the sexual education groups for number of sexual partners during college was only present in females (abstinence-only group:  $M = 1.36, SD = 1.08$ ; comprehensive group: ( $M = 1.78, SD = 2.07$ ),  $t(468) = -3.04, p = .003, d = .28$ , indicating females from the comprehensive sexual education group had slightly more partners than the abstinence-only group. The males-only analysis did not reach significance (abstinence-only group:  $M = 2.25, SD = 2.13$ ; comprehensive group: ( $M = 2.05, SD = 2.90$ ).

When analyzing the number of sexual partners in the last three months, the mean difference between sexual education groups was not statistically significant,  $t(382) = -.53, p = .59$ . Both sexual education groups' mean number of sexual partners were almost identical (abstinence-only group:  $M = 1.15, SD = .71$ ; comprehensive group: ( $M = 1.19, SD = .94$ ).

Table 3

*t-Test Results Comparing Sex Education Groups on Sexual Risk Factors*

Risk Factors	Abstinence-Only Model		Comprehensive Model		<i>p</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	
Female					
Partners in College	1.36	1.08	1.78	2.07	0.003**
Partners in Past 3 Months	1.10	0.67	1.20	0.89	0.16
% of Time Alcohol/Drug influence	18.39	27.01	18.52	28.82	0.96
% of Time Condom Usage (single only)	66.96	42.36	54.61	45.59	0.09
Male					
Partners in College	2.25	2.13	2.05	2.90	0.72
Partners in Past 3 Months	1.38	0.87	1.15	1.06	0.25
% of Time Alcohol/Drug influence	33.41	39.79	23.48	33.83	0.15
% of Time Condom Usage (single only)	79.00	36.11	58.23	47.82	0.06
Overall					
Partners in College	1.52	1.37	1.86	2.34	0.02*
Partners in Past 3 Months	1.15	0.71	1.19	0.94	0.59
% of Time Alcohol/Drug influence	21.15	30.20	19.91	30.36	0.64
% of Time Condom Usage (single only)	70.06	40.91	55.80	46.25	0.02*

Note. \* $p < .05$ . \*\* $p < .01$ .

### **Influence of Alcohol and/or Drugs**

The percentage of times having sexual intercourse while under influence of alcohol and/or drugs in the past three months did not reach significance between sexual education groups,  $t(711) = .47$ ,  $p = .64$ . The abstinence-only group ( $M = 21.15$ ,  $SD = 30.20$ ) had a slightly higher mean percentage of times compared the comprehensive group ( $M = 19.91$ ,  $SD = 30.36$ ) but not significantly different. When examining each sex independently, females from both sexual education groups (abstinence-only:  $M = 18.39$ ; comprehensive:  $M = 18.52$ ) averaged an almost identical percentage of times having sexual intercourse while under influence of alcohol and/or drugs in the past three months, which was not statistically significant. For males, the sexual education group mean differences did not reach significance,  $t(181) = 1.46$ ,  $p = .15$ , but indicated males from the abstinence-only group ( $M = 33.41$ ,  $SD = 39.79$ ) had sexual intercourse

under the influence of alcohol or drugs a slightly higher percentage of the times compared to the comprehensive group ( $M = 23.48$ ,  $SD = 33.83$ ).

### **Condom Usage**

To examine condom usage as a prophylactic, only students who reported being single (omitting casual and serious dating) were analyzed ( $n = 276$ ). There were no significant mean difference in the use of a condom during the last time having sexual intercourse,  $t(125) = -1.82$ ,  $p = .07$ ,  $d = .33$ . There was a statistically significant mean difference in the percentage of times single respondents used a condom in the past three months,  $t(122) = 2.39$ ,  $p = .02$ ,  $d = .43$ , indicating single respondents who received abstinence-only ( $M = 70.06$ ,  $SD = 40.91$ ) reported using a condom a higher percentage of the time in the last 3 months compared to the comprehensive group ( $M = 55.8$ ,  $SD = 46.25$ ). However, when overall condom use while in college was examined, results were no longer significant between sex education groups,  $t(274) = -.38$ ,  $p = .70$ ,  $d = .05$ .

### **Discussion**

Many studies have examined differences in risky sexual behaviors of adolescents based on formal sexual education but have not extended this to the college years. Previous research analyzing young adults' sexual behavior by type of sexual education experienced had limitations including indirect measurement of sexual education groups (Lindberg & Maddow-Zimet, 2012) and use of only one behavior measurement (Walcott et al., 2011). Our study addressed these limitations by measuring sexual education groups by asking directly which type they had received as well as measuring multiple indicators of risky behavior. We found that sexual values aligned with their prescribed sexual education program with those who received abstinence-only reporting causal sexual intercourse and pre-marital sexual intercourse as less acceptable than

those who received comprehensive sexuality education. However, when self-reported sexual behaviors were examined, there were no practical differences based on type of sexual education. Though a few tests were statistically significant, the differences showed a lack of practical significance as indicated by the small mean group differences. For example, when the number of sexual partners was statistically significant, the means were 1.52 persons compared to 1.86 persons putting our groups at not even a full person difference in number of partners.

As previous research has mainly looked at sexual values *or* sexual behaviors (Bleakley, 2009; Kirby, 2007), it was surprising when measuring both concurrently to have incongruent responses with values not matching behaviors. Based on Bardi and Schwartz's (2003) findings, the normativity of sexual behaviors in college may be strong enough to weakly associate with the related expressed values. This may explain why sexual values were significantly different between sexual education groups, but the behaviors were not. Additionally, Morgan and Zurbriggen (2012) found that sexual values changed from the first year of college to the second with a greater acceptance of casual sex. Due to the large percentage of freshmen in our sample, there is a chance sexual values are in the process of changing, accounting for the current significant difference in values between groups. As sexual involvement increases, sexual values may change to be more accepting and become congruent with sexual behaviors measured. In line with previous research (Lindberg & Maddow-Zimet, 2012; Walcott et al., 2011), the results of this study show the differences in delivery of formal sexual education often found in adolescence did not continue into the first two years of college.

It was hypothesized that respondents would differ in sexual behavior based on the type of sexual education they received; however, this was not supported as the groups were practically indistinguishable by sexual behaviors. Social norms theory (Berkowitz, 2004) is one meaningful

way to explain the lack of sexual behavioral differences for college students in regards to sexual education. Social norms theory posits that perception of social group behavior influences individual behavior. Therefore, the desire of students to engage in more normative behaviors may be greater than the influence their sexual education background. Social norms theory, also postulates that perceptions of peer behaviors can be incorrect with risky behaviors being overestimated and protective behaviors underestimated. As students want to act in a manner consistent with their peer group, they may engage in risky sexual behaviors based on erroneous perceptions. For example, their risky behavior may result from overestimating the number of sex partners college students have, or underestimating the frequency of condom usage. Scholly, Katz, Gascoigne, & Holck, (2005) tested social norms theory by examining sexual behaviors and perceptions of undergraduate college students and found that students overestimated the amount of sexual activity by their peers through incorrectly perceiving their peers had three or more sexual partners when the majority had only one sexual partner. This confirmed the assumption within social norms theory that risky behavior of peers is overestimated. The new perceptions of peer sexual behavior while in college (Scholly et al., 2005) may change sexual values (Morgan & Zurbriggen, 2012) and impact individual sexual behavior regardless of received type of sexual education.

### **Implications**

Approximately 40% of the sexually active respondents had never been tested for STIs. About 20% of respondents indicated they had never used condoms while in college. Only 45% of respondents indicated they had always used condoms while in college. A quarter of the sample indicated that at least 50% of the times they had had sex in the past 3 months they were under the influence of alcohol and/or drugs. This demonstrates clear evidence that students are engaging in

risky sexual behaviors which can have a dramatic negative impact on their future health and life outcomes.

An important implication from these findings is the strong need for continued sexual education into the college years directed at the perceived sexual norms being faced by college students in order to combat risky sexual behavior. It may be beneficial to implement continued sexual education through Resident Advisors (RAs) in college dorms which are comprised of primarily freshmen students at most universities. Continued sexual education should address social norms to help students have more accurate information regarding sexual behaviors (e.g., number of partners, alcohol use during sex, condom usage).

The lack of differences between groups puts to question what can be improved upon to ensure the beneficial outcomes of sexual education have a longer lasting effect. This lack of carry-over from adolescence to college years would indicate a need for improvement in the formal sexual education system to ensure longer lasting results and the extension of sexual education through the beginning of college. Sexual education for college students should address new issues being faced at the appropriate development level for young adults compared to middle school and high school programs. Moore and Smith (2012) conducted a sexual education program for college students and found that after the program, students had increased knowledge of STIs and condom use to which they concluded the continuation of sexual education was beneficial based on important gaps of sexual knowledge prior to intervention. Additionally, Frost, Lindberg, and Finer (2012) found disturbingly low levels of knowledge among young adults (aged 18-29) regarding contraception and pregnancy prevention. They too concluded a strong need for new sexual educational strategies targeting young adults. The potential reduction of risky sexual behaviors from continued sexual education would lead to a healthier young adult

population and hopefully reduced STIs and unintended pregnancies, but this can only be achieved if all forms of sexual education (e.g., formal, parents, community) are improved upon.

In addition, we found a significant difference in sexual values, but not in sexual behaviors between the sexual education groups. An implication of this finding is the importance of evaluating programs based on behaviors versus attitudes and values alone. If research shows a sexual education program successfully changes attitudes and values, this may not translate into actual changed behavior which is more meaningful in regards to reducing STIs and unintended pregnancy. The abstinence-only students in this study rated pre-marital sex and casual sex more wrong than those in the comprehensive group, yet they engaged in similar behaviors implying that sexual values may not be strongly related to sexual behaviors. Therefore, sexuality educators need to demonstrate programming that addresses both attitudes and behaviors.

### **Limitations and Future Research**

There were several limitations for this study. The first limitation of this study was the use of a convenience sample of undergraduate students which may create a sample bias (Kraut et al., 2004) and limits population generalizability (Peterson, 2001). There was also an over-sampling of females compared to university population. The use of extra credit as an incentive, although used to increase response rates (Cobanoglu & Cobanoglu, 2003; Evans & Mathur, 2005), leads to another sample bias concern that those who decide to take the survey may differ from those who do not. However, an alternative benign extra credit option was made available to address this sampling bias. Malicious intent (Kraut et al., 2004), including multiple response rates (Birnbaum, 2004; Gosling, Vazire, Srivastava, & John, 2004) are potential concerns and limitations for internet based research. Based on the anonymity of internet surveys, multiple responses and sharing of the survey with others can be a concern (Kraut et al., 2004). Although

the current study was conducted anonymously to ensure complete confidentiality, the linked extra credit page with identifying information was filled out for all surveys completed and none had been duplicate names or names of participants not enrolled in the courses being given the survey which addresses the aforementioned concerns.

Other limitations to consider were the use of self-report data and recall error on the independent variable. Self-report data is open to erroneous responses, although the use of an anonymous online survey should help combat this issue as previous research has found higher honesty among measures that are perceived to be highly anonymous (Supple et al., 1999). Based on the time lapse between the received sex education in middle school and high school and the time of the survey, there may be recall error (Eisenhower et al., 2004), in which respondents may have incorrectly identified which type of sexual education they had received. The use of only freshman and sophomore students was one way we tried to combat the lapse in time limitation. Finally, although type of sexual education was determined, the quality and quantity of the programs were not measured to help distinguish between groups. Although there are many limitations to take into consideration, the impact of prior received formal sexual education on risky sexual behaviors for college students has been researched minimally and many of the limitations will be addressed in intended future studies.

Future research would ideally have a longitudinal design to confirm whether sexual values and behaviors do change over time from adolescence to college. This would help address the significant difference we found in sexual values, but not in behaviors between sexual education programs. It would be beneficial to measure the quality and quantity of received sexual education as not all comprehensive and abstinence-only programs are equal (Landry et al., 2003). Additionally, in order to test social norms theory for sexual behavior (Berkowitz, 2004;

Scholly et al, 2005), perceived peer behaviors should be measured and compared against actual behaviors. This could determine if students overestimate the risky behaviors of their peers and underestimate the protective behaviors in regards to sexual behaviors. In conclusion, although we no longer found outcome differences based on sexual education in the first two years of college, it is clear risky sexual behavior is still prominent among college students suggesting continued sexual education would be beneficial. Interestingly, we found sexual values were not congruent with sexual behaviors and is worth investigating in future studies.

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