

## Heterosexual Anal Intercourse: An Understudied, High-Risk Sexual Behavior

Janice I. Baldwin, Ph.D.,<sup>1</sup> and John D. Baldwin, Ph.D.<sup>1</sup>

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*Differences between heterosexuals who have or have not engaged in anal intercourse were analyzed. Though anal intercourse is widely recognized as an activity that greatly increases the risks for HIV transmission, it has received little attention in heterosexual populations. A questionnaire was mailed to a random sample of university students, a population in which many people engage in vaginal intercourse with several partners each year. The three largest minorities were randomly oversampled in order that all four major ethnic/racial groups could be statistically evaluated for possible differences. Almost 23% of nonvirgin students had engaged in anal intercourse. Regression analysis indicated that people who had participated in anal intercourse were more likely than people without anal experience to have been younger at first vaginal intercourse, to be older when the data were collected, to have engaged in vaginal intercourse in the last three months before data collection, to be more erotophilic, to use less effective contraceptive methods, and to have used no condom at last coitus. Overall, people who engage in anal intercourse take more sexual risks when engaging in vaginal intercourse than do people without anal experience. No major ethnic/racial differences were detected. Sexologists have not explored anal sex in much detail, hence we have been weak in educating those 20 to 25% of young adults who are not reluctant or (inhibited about) exploring anal intercourse. As young adults use condoms less for anal than vaginal intercourse, they have not learned enough about the risk of anal sex.*

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**KEY WORDS:** college students; sexual behavior; anal intercourse; risky sexual behavior; sensation seeking.

<sup>1</sup>Department of Sociology, University of California—Santa Barbara, Santa Barbara, California 93106; e-mail: baldwinj@sscf.ucsb.edu.

## INTRODUCTION

The human immunodeficiency virus (HIV) is more easily contracted by anal intercourse than vaginal or oral intercourse (Lazzarin *et al.*, 1991; Mayer and Anderson, 1995; Silverman and Gross, 1997). Although anal intercourse among gay men and bisexuals has received a great deal of attention, considerably less research has focused on anal intercourse among heterosexuals, even though the prevalence of heterosexual anal activities have been well documented (Hunt, 1974; Laumann *et al.*, 1994). Using survey data, Voeller (1991) estimated that 25% of American women and their male partners engage in anal intercourse occasionally, and 10% do so on a somewhat regular basis.

This paper examines numerous aspects of anal intercourse from a random sample of university students. This is an important population to study because many of these young adults are sexually active with multiple partners, and 25% of people who contract HIV do so before 20 years of age. In their college study, Johnson *et al.* (1994) found that the students who were infected with HIV were almost three times more likely to have engaged in anal intercourse than those students who were not infected.

Most researchers and sex educators do not pay much attention to the topic of anal intercourse. Polite conversation and Victorian values lead most people to leave this sexual practice among the "unspoken" aspects of social life. Many studies of college students have simply ignored anal intercourse (Belcastro, 1985; Earle and Perricone, 1986; Huang and Uba, 1992; Keller *et al.*, 1982; Murstein and Mercy, 1994; Prince and Bernard, 1998; Robinson *et al.*, 1991; Roche *et al.*, 1993; Turner *et al.*, 1993). Several researchers have commented briefly on the incidence of anal intercourse among college students (Cochran *et al.*, 1991; DeBuono *et al.*, 1990; Fleuridas *et al.*, 1997; Gilbert and Alexander, 1998; Hsu *et al.*, 1994; Hutchison, 1994, 1996; Kotloff *et al.*, 1991; MacDonald *et al.*, 1990; Reinisch *et al.*, 1992; Shapiro *et al.*, 1999; Taylor *et al.*, 1997; Weinberg *et al.*, 1998), but few have analyzed it in depth. Even researchers who include questions about anal intercourse for heterosexuals do not specifically report on activities such as condom use during anal intercourse.

Because sexologists have not studied heterosexual anal sex in much detail or collected much data on it, sex educators are ill-prepared for teaching adolescents and adults who are interested in trying anal intercourse. Many people who engage in anal sex use condoms less for anal than vaginal intercourse, suggesting that they have not learned enough about the risks associated with anal intercourse. The goals of this study are not only to examine the prevalence of anal intercourse among college students, but also to analyze various behaviors related to anal activities, including the degree to which individuals take precautions about anal and vaginal intercourse.

## MODEL AND HYPOTHESES

A literature review suggested several hypotheses relevant to anal intercourse. The first derives from the research on erotophobia and erotophilia (Fisher, 1988; Fisher *et al.*, 1983), which shows that sex-phobic people tend to avoid more sex-related activities than people without erotophobia. Given erotophobes' general discomfort with sex, we hypothesize that they are less likely than erotophiles to engage in anal intercourse.

The second hypothesis relates to religion. People with serious religious commitments might be expected to abstain from anal intercourse due to scriptural proscriptions. After all, they are more restrained in their vaginal activities than are less religious people (Mahoney, 1980; Thornton and Camburn, 1989). Thus, we hypothesize that people who attend services frequently will be less likely to engage in anal intercourse than are people who attend services infrequently.

Hypothesis three centers on ethnicity and race. Even though studies on college students give us little reason to predict any differences in anal intercourse among ethnic or racial groups (Belcastro, 1985; Cochran *et al.*, 1991; Huang and Uba, 1992), there have been too few studies on ethnicity, race, and anal intercourse to leave this issue unexamined. Thus, we predict a relationship may exist, even though the research to date does not suggest one.

Hypothesis four is that women are more likely than men to engage in anal intercourse. Research on college students suggests that women are slightly more likely to report engaging in anal intercourse than men, although this difference is not statistically significant (Cochran *et al.*, 1991; Hsu *et al.*, 1994; Kotloff *et al.*, 1991; MacDonald *et al.*, 1990; Reinisch *et al.*, 1992). Following a logic similar to that given for hypothesis three, we explore hypothesis four rather than assuming that prior studies have proved no gender differences in anal intercourse.

The fifth hypothesis is that students coming from low-income families are more likely to engage in anal intercourse than their peers from high-income families. MacDonald *et al.* (1990) reported that students from lower socioeconomic classes were more likely to engage in anal intercourse than students from higher socioeconomic classes. Sixth, we hypothesize that the present age of the respondents is positively related to engaging in anal intercourse: Older people have simply had more years and opportunities than younger people have had to explore a variety of sexual behaviors, including anal intercourse.

Seventh is a series of closely related hypotheses derived from the literature on risk taking and sensation seeking (Aggleton *et al.*, 1994; Seidman *et al.*, 1994; Small and Luster, 1994; Valois *et al.*, 1997; Zuckerman, 1974, 1976, 1979, 1994; Zuckerman *et al.*, 1976). Some of these hypotheses when taken alone are of limited power, but taken together as a whole, they open an important topic of inquiry.

Zuckerman (1979) presents data showing that people have significant individual differences in the need for novel stimulation and high levels of physiological arousal. This suggests that there may be a generalized personality trait for seeking or avoiding exciting and dangerous activities: Zuckerman (1994) describes sensation seeking and risk taking as “a trait defined by the *seeking* of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, *legal* and *financial* risks for the sake of such experience” (p. 27). Zuckerman suggests that risk takers would be more inclined than others to engage in unsafe sexual activities. Anal intercourse would qualify as an unsafe sexual activity. Hovell *et al.* (1994) provide independent documentation that youths who engage in risky nonsexual behaviors also engage in unsafe sexual behavior.

An early lead for the development of the risk-taking hypotheses was the finding that seatbelt use, a nonsexual behavior, is correlated with sexual and other risk-taking behaviors (Clément and Jonah, 1984; Harvey and Spigner, 1995; Hersch and Viscusi, 1990). Thus, one subset of hypothesis seven is that people who use seatbelts the least are the most likely to engage in anal intercourse.

Another nonsexual behavior that has been found to be associated with risk-taking behavior is drug use: The literature shows that people who like sensory stimulation and risk taking tend to explore numerous drugs (Zuckerman, 1974, 1994). This and research by Graves and Leigh (1995) and Rotheram-Borus *et al.* (1994) suggest another subset of hypothesis seven: Those people who have used alcohol, marijuana, cocaine, and other recreational drugs will be more likely to engage in anal intercourse than those who have not used such drugs.

People who seek high levels of sensory stimulation often throw caution to the winds, taking risks that others would not. MacDonald *et al.* (1990) reported that students who engaged in anal intercourse had more vaginal partners than those who had not. Zuckerman *et al.* (1972, 1976) found that high sensation seekers had more sexual partners and engaged in more sexual activities than low sensation seekers. It is also reasonable to predict that high sensation seekers will be more likely to begin vaginal intercourse at an earlier age. Therefore, we hypothesize that people who engage in anal intercourse begin vaginal intercourse at an earlier age, have more vaginal partners in their lives, and are “currently” sexually active (having had intercourse in the previous 3 months). In a related vein, we predict that people who are risk takers are not only more likely to engage in anal intercourse than others, but also are less likely to show caution during vaginal intercourse—using birth control and condoms less frequently than people who limit their risks.

The literatures on sexual behavior and risk taking suggest the hypothesis that people who engage in anal intercourse would *not* be more worried than their peers about contracting HIV and would *not* see themselves to be at higher risk (Aggleton *et al.*, 1994; Overby and Kegeles, 1994). If anything, risk-takers might be expected to be less fearful or worried than people who were not used to taking risks.

The last subset of hypothesis seven is that knowledge about modes of HIV transmission—including anal intercourse—is as good among people who have

engaged in anal intercourse as people who have not. Horvath and Zuckerman (1993) found that people high on sexual risk taking did not differ significantly from people low on sexual risk taking in their knowledge of activities that transmit AIDS. Gold *et al.* (1994) found that male homosexuals who engaged in unsafe anal intercourse were not less knowledgeable about the HIV risks associated with this behavior than were gay men who do not engage in unsafe anal intercourse.

## METHODS

### Instrument

The six-page questionnaire used in this research was adapted from questionnaires used in three prior studies. It was designed to examine the thoughts, emotions, and activities of college students regarding sexual behavior, along with their attitudes and knowledge about AIDS (Baldwin and Baldwin, 1988; Baldwin, 1990, 1992). The methods used in developing and testing these questionnaires are explained in early publications (Baldwin *et al.*, 1990, 1992). The behavior variables had a test–retest reliability of 0.88. The present questionnaire included the revised form of the Sexual Opinion Survey (SOS) measuring erotophobia–erotophilia (Fisher, 1988).

### Respondents and Procedure

We mailed copies of the questionnaire to a random sample of approximately 11% of the undergraduate population of a medium-size university. To ensure that the racial/ethnic minorities on campus were adequately represented for statistical analysis, the sample was stratified in order to oversample the minorities, although these individuals were still selected randomly from within each group. The questionnaire was mailed via third-class mail to a total of 1779 undergraduate students, and 893 students responded, yielding a response rate of 50.2%. Because many of these students change addresses yearly or more often and third-class mail is not forwarded or returned if undeliverable, some 5% to 10% of students may not have received the questionnaire we mailed, making the estimated response rate approximately 53% to 55%.

These data have only been used for the current study of anal intercourse. Before the data were analyzed, all students 30 years of age and older were omitted from the sample. This was done to make the present study more easily comparable with prior studies on college students, which tend to omit older students because their marital status, number of sexual partners, sexual behavior, and drug use are often substantially different from the majority of younger undergraduates. Also omitted from the analyses were all students who had never engaged in vaginal intercourse, because they did not provide information relevant to several practices

related to the core hypotheses of this study. The analysis included 8 homosexual and 23 bisexual students who had engaged in *both* vaginal and anal intercourse. Their sexual activities are relevant to the heterosexual population, including the heterosexual spread of HIV, because they have engaged in sexual intercourse with heterosexuals. As a result, the following report is based on the 647 nonvirgin undergraduate students under 30 years of age.

## RESULTS

### Descriptive Statistics

Descriptive statistics were calculated for the final sample of nonvirgins used in the analysis and for selected variables of general interest (Table I). The sample was 37.2% male, and the average age of the respondents was 20.8 years. The ethnic/racial composition was 8.5% African American, 19.8% Asian American, 21.3% Latino, and 51.4% white. The students were predominantly from middle-class families, with an average annual income of \$50,000 to \$74,999.

Frequency data are relevant because the literature on anal sexual behavior is deficient in these, especially for heterosexuals. Stepping back to view the total data set, including virgins and nonvirgins, 78% of the students reported having had vaginal intercourse, and 18% anal intercourse. Among our sample of nonvirgins, 22.9% reported that they had also engaged in anal intercourse, and the average reported age for first vaginal intercourse was 16.8 years, whereas the age of first anal intercourse was 18.8 years.

Reported condom use during anal intercourse was low, averaging 20.9% of the time in the previous 3 months, compared with 42.9% of the time for vaginal intercourse in the same time period. Whereas 42.6% of people reported having never used condoms for vaginal intercourse in the previous 3 months, 76.1% reported no condom use for anal intercourse in that period of time. Most important, low rates of condom use during vaginal intercourse in the previous 3 months were reported more commonly by people with anal experience than those without it: 65.4% of the people who engaged in anal intercourse used condoms 25% of the time or less, compared to 45.2% of people who did not engage in anal intercourse. The average percentage of time that students reported condom use for vaginal intercourse was 30.1% for the people who engaged in anal intercourse and 47.2% for people who did not engage in anal intercourse. People reporting that they engaged in anal intercourse were also more likely to report having had at least one sexually transmitted disease (STD) and to have been tested for HIV than did people who did not report engaging in anal intercourse: 20.3% of people who engaged in anal intercourse reported having at least one STD and 41.1% had been tested for HIV, compared to 12.0% and 27.6%, respectively, for people who did not engage in anal intercourse.

**Table I.** Descriptive Statistics for Coitally Experienced Respondents

Variable	Range	Mean
Erotophobia–erotophilia <sup>a</sup>	19–124 (erotophobic to erotophilic)	78.587
Religious events frequency	1–6 (never–once a week or more)	2.600
African-American	0–1 (all others–African American)	0.085
Asian-American	0–1 (all others–Asian American)	0.198
Latino	0–1 (all others–Latino)	0.213
Gender	0–1 (female–male)	0.372
Parental income	1–5 (under \$25,000–\$100,000 or more)	3.272
Age	18–29 (18–29 years)	20.786
Seatbelt use	0–100 (0–100% of the time)	92.776
Anal intercourse	0–1 (no–yes)	0.229
AIDS knowledge	0–19 (0–19 answers correct)	16.847
Semen–blood risky	0–1 (not transmit–transmit)	0.960
Anal sex risky	0–1 (not transmit–transmit)	0.937
Transmission risk rate	1–9 (99% or more–1% or less)	3.640
Condom protection	1–4 (no protection–total protection)	2.760
Believe self at risk	1–5 (very unlikely–very likely)	2.249
Worry contract HIV	1–4 (not at all–great deal)	2.136
Tested for HIV	0–1 (no–yes)	0.307
Drugs ever used <sup>b</sup>	0–9 (0–9 drugs)	2.482
Age first vaginal sex	8–24 (8–24 years)	16.828
Age first anal sex	8–25 (8–25 years)	18.772
Total number of vaginal partners	1–99 (1–99 partners)	6.616
Had coitus previous 3 months	0–1 (no–yes)	0.763
Anal sex previous 3 months	0–1 (no–yes)	0.301
Safety of birth control method used last coitus	1–4 (85% failure rate–3% or less)	3.262
Mean condom use for coitus previous 3 months	0–100 (0–100% of time)	42.905
Mean condom use for anal sex previous 3 months	0–100 (0–100% of time)	20.870
Condom last coitus	0–1 (no–yes)	0.470
Had an STD <sup>c</sup>	0–4 (0–4 STDs)	0.162

<sup>a</sup>The erotophobia–erotophilia score was based on the 21 SOS statements, which were scored on a 7-point Likert-type scale ranging from strongly agree to strongly disagree. The summary score was created in the standard way (see Fisher, 1988).

<sup>b</sup>The nine drugs recorded were alcohol, marijuana, cocaine or coke, amphetamines, designer drugs, barbiturates, tranquilizers, heroin, or other narcotics.

<sup>c</sup>Respondents could select any of seven choices—chlamydia, herpes, gonorrhea, nongonococcal urethritis, trichomoniasis, syphilis, and genital warts.

All nonvirgins were knowledgeable about the means of HIV transmission. Both groups—students who had participated in anal intercourse and those who had not—were similarly knowledgeable about the role of semen and anal intercourse in transmission. Both groups also knew that condoms provide good protection from HIV. Nonvirgins who had engaged in anal intercourse and those who had not engaged in anal intercourse had similar, although incorrect knowledge about the risk of HIV transmission from one act of vaginal intercourse with an infected partner: The majority of both groups believed their chances of contracting HIV

from one act of coitus with an infected partner was 75% or higher—although the actual risk is closer to 0.2%.

### Correlation Analysis

Analyses of correlations among variables used in the regression analysis revealed that, as hypothesized, people reporting that they engaged in anal intercourse were more likely to be erotophilic than the other nonvirgins ( $r = 0.206$ ;  $p < .0001$ ). The correlation data did not support hypothesis two or three relevant to religiosity and ethnicity/race. Hypothesis four was also not supported. Indeed, it was contradicted: Gender yielded a significant finding that was unpredicted: Males were more likely to engage in anal intercourse than females ( $r = 0.106$ ;  $p < .01$ ). Contrary to hypothesis five, socioeconomic status did not correlate with anal intercourse. Supporting hypothesis six, anally experienced individuals tended to be older than nonvirgins who did not report engaging in anal sex ( $r = .244$ ;  $p < .0001$ ).

Correlation data partially supported the seventh hypothesis about sensation seeking and risk taking. People who engaged in anal intercourse were more likely to be younger at first vaginal intercourse ( $r = -0.117$ ;  $p < 0.01$ ) and to have had more vaginal intercourse partners than nonvirgins who had not engaged in anal sex ( $r = 0.220$ ;  $p < .0001$ ). They also were more likely to have engaged in vaginal intercourse in the previous 3 months ( $r = 0.149$ ;  $p < .001$ ). However, contrary to hypothesis seven, people who engaged in anal intercourse were not significantly less likely to use seatbelts ( $r = -0.066$ ). Also contrary to prediction, people reporting engaging in anal intercourse did not use riskier methods of contraception than those not reporting anal sex ( $r = -0.064$ ). However, they took other risks, reporting less condom use at last vaginal intercourse ( $r = -0.166$ ;  $p < .0001$ ): Only 31.8% of the people who engaged in anal sex reported using condoms the last time they had vaginal intercourse, compared with 51.5% of the people who engaged in anal sex. As predicted, people who indicated that they engaged in anal sex were more likely to have used a variety of drugs than people who did not indicate such experience ( $r = 0.183$ ;  $p < .0001$ ). As hypothesized, students who reported engaging in anal intercourse did not worry more about contracting HIV ( $r = -0.016$ ) or judge themselves to be at greater risk for contracting HIV ( $r = 0.037$ ), nor were they less knowledgeable about HIV transmission than the other nonvirgins ( $r = 0.011$ ).

### Regression Analysis

A simultaneous regression analysis was used to evaluate the unique contribution of each variable related to anal intercourse because it could partial out the variance accounted for by the other variables. Because the dependent

variable—having engaged in anal intercourse—is a dichotomous variable, logistic regression analysis was used. The regression analysis included all people who had engaged in vaginal intercourse, not just heterosexuals or people who had done so in the previous 3 months. A total of 18 independent variables were included in the regression equation to examine their possible effects on participation in anal intercourse. Because the hypotheses developed in this study came from such disparate sources, we have no rationale for justifying any particular ordering for conducting a stepwise regression.

The regression analysis indicated that the dependent variable, engaging in anal intercourse or not, was significantly affected by the following: erotophobia–erotophilia, current age, age at first vaginal intercourse, having engaged in vaginal intercourse in previous 3 months, effectiveness of contraception used, and condom used at last coitus (Table II). The people who had participated in anal intercourse were more likely to be more erotophilic than people who had not engaged in anal sex, to be older now, to have begun vaginal intercourse at an earlier age, to have engaged in vaginal intercourse in the previous 3 months, to have used less effective methods of birth control, and not to have used a condom at last vaginal intercourse.

The first hypothesis about erotophobia–erotophilia was supported. In fact, 14.3% of the erotophobes (who are defined as measuring less than 66 on the SOS scale) had engaged in anal intercourse, compared with 34.4 % of the erotophiles

**Table II.** Predictors for Engaging in Anal Intercourse

Variable	Parameter estimate
Erotophobia–erotophilia	0.0204 <sup>a</sup>
Religious events frequency	0.1145
African-American	0.0529
Asian-American	0.3424
Latino	0.1520
Gender	0.0794
Parental income	−0.0641
Age	0.2606 <sup>b</sup>
Seatbelt use	−0.0019
Drugs ever used	0.0742
Age first vaginal sex	−0.1332 <sup>c</sup>
Total number of vaginal partners	0.0128
Had coitus previous 3 months	1.0758 <sup>a</sup>
Safety of birth control method used last coitus	−0.2593 <sup>c</sup>
Condom last coitus	−0.5865 <sup>c</sup>
Worry contract HIV	−0.0752
Believe self at risk	0.0472
AIDS knowledge	0.0394
Constant	−6.9250 <sup>b</sup>

Chi-square for covariates  $p = 0.0001$ .

<sup>a</sup>  $p < 0.001$ .

<sup>b</sup>  $p < 0.0001$ .

<sup>c</sup>  $p < 0.05$ .

(who are defined as measuring more than 95 on the SOS scale). The second hypothesis was not supported: The frequency of attending religious services did not affect anal intercourse.

Relevant to the third and fourth hypotheses, neither race/ethnicity nor gender was related to anal intercourse. Of the people who reported engaging in vaginal intercourse, anal intercourse was reported by 25.4% of Latinos, 23.4% of Asian Americans, 22.1% of whites, and 20.9% of African Americans. The regression analysis did not find an effect of gender on engaging in anal intercourse, even though the correlation analysis did. Contrary to our fifth hypothesis, the socioeconomic status of one's parents (measured by income) was not related to anal intercourse. In support of the sixth hypothesis, older students were more likely to report engaging in anal intercourse. Anal intercourse was reported among 6.9% of those younger than 19 and 48.0% of those older than 24.

Several subsets of the seventh hypothesis about sensory stimulation were supported. People who like and seek out novel sensations would be expected to begin vaginal intercourse at an earlier age than those who do not, and 33.1% of people reporting anal experience began vaginal intercourse at age 15 or younger, compared with 20.8% of those not reporting engaging in anal sex. Also statistically significant was the finding that, during the previous 3 months, people who engaged in anal sex were more likely than those who did not to have engaged in vaginal intercourse: 87.8% of those reporting anal intercourse reported having vaginal intercourse in the previous 3 months, compared to 72.8% of those not reporting engaging in anal intercourse. As predicted, people who engaged in anal sex took more risks with vaginal intercourse, being less likely to use contraception or using less effective means of contraception.

However, contrary to prediction, the people reporting engaging in anal intercourse did not have more vaginal intercourse partners in the regression analysis (although they did in the correlation analysis). It was predicted that those who had used more drugs would be more likely to engage in anal intercourse, but the regression analysis did not support this. The data on a nonsexual form of risk taking—namely, seatbelt use—did not support the hypothesis that some people have a generalized tendency to take risks.

The predictions related to beliefs and worry about contracting HIV were supported. People reporting engaging in anal sex did not worry more than those who did not about contracting HIV as a result of their sexual activity, nor did they believe they were at greater risk for contracting the virus than others. Also as predicted, students who had engaged in anal intercourse were not less knowledgeable about HIV transmission than the other students.

## DISCUSSION

The limitations to this study must be considered before drawing conclusions from the statistical analyses. Although we attempted to obtain a random sample of

students, the estimated response rate was 53% to 55%; hence, the randomness of the sample is not assured. Bogaert (1996), Catania *et al.* (1990), and others found that more liberal and sexually experienced people are more likely to volunteer for studies of sexual behavior than are conservative people, which could bias our results to show more sexual activity than would have been found if all students had responded.

There are at least four other problems: First, all self-reported data can be held suspect because people can construct these data without the constraints of needing to provide empirical proof. Second, respondents tend to underreport illegal or stigmatized behavior such as drug use and anal intercourse (Mensch and Kandel, 1988). Third, it is difficult to know how far our findings generalize to other college campuses, much less to noncollege populations. Laumann *et al.* (1994) found in their national sample of 18- to 59-year-old people that, among heterosexuals, 15.8% of males and 16.2% of females in the 18–24 age group reported ever engaging in anal intercourse, which is lower than the percentages typically reported in college studies.

Fourth, our study did not explore the possibility that some students may engage in anal intercourse as a method of birth control without considering that it might be risky for other reasons. Perhaps, some couples turn to anal intercourse as a way to have sexual relations while assuring the female remains a vaginal virgin, or a “technical virgin.” In our sample, there were no vaginal virgins who reported engaging in anal intercourse. Nevertheless, some females may have begun anal intercourse for this reason, then later added vaginal activities.

In spite of these limitations, the present study provides important information about an underresearched topic—heterosexual anal sexual behavior and its correlates. The present study reveals a substantial amount of risky anal intercourse because 22.9% of the nonvirgins reported having tried it. This percentage is in line with those given by various other studies on college campuses (Cochran *et al.*, 1991; Hsu *et al.*, 1994; Hutchison, 1994, 1996; Kotloff *et al.*, 1991; MacDonald *et al.*, 1990; Reinisch *et al.*, 1992) and from young noncollege populations (Catania *et al.*, 1989; Heffernan *et al.*, 1996; Langille *et al.*, 1994; Norris *et al.*, 1996; Stanton *et al.*, 1994). However, most of those studies did not examine anal intercourse in detail.

Our first hypothesis was supported: People who engaged in anal sex scored higher on erotophilia. However, the direction of the causal arrows cannot be determined: Erotophilia might lead a person to try many sexual activities that erotophobes would not. However, a peer group that rewarded individuals for exploring anal intercourse and various other sexual practices might foster erotophilia. In addition, both erotophilia and anal experience could result from other causes, such as high sensation-seeking behavior, which results in high risk taking. For example, Zuckerman (1994) reports that high stimulation seekers experiment with a larger number of different kinds of sexual activities than do low stimulation seekers.

Hypothesis two was not supported: A high frequency of attendance at religious services was not associated with low incidence of anal intercourse in either the correlation or regression analyses. Davidson *et al.* (1995) found that greater frequency of religious attendance did not decrease participation in anal intercourse. Similarly, Daugherty and Burger (1984) found little relationship between the sexual values taught at church and students' sexual and contraceptive behaviors.

As we anticipated when creating the regression model, hypotheses three and four were not supported. None of the traditional background variables—ethnicity, race, or gender—was associated with anal intercourse. Although males were more likely than females to engage in anal intercourse according to the correlation statistics, there was no gender difference for engaging in anal intercourse when other variables were controlled for in the regression analysis. In our study, 19.5% of the nonvirgin females and 28.6% of the nonvirgin males reported engaging in anal intercourse. This is somewhat different from other college studies: In a convenience sample of college students in the Midwest, Reinisch *et al.* (1992) reported that 19% of nonvirgin men and 22% of nonvirgin women had engaged in anal intercourse. In a large nationally representative survey of first-year college students across Canada, MacDonald *et al.* (1990) found that 19% of the nonvirgin women and 14% of the nonvirgin men had engaged in anal intercourse.

Hypothesis five was not supported: Although parents' income was predicted to affect anal intercourse, it may be that the sample population was too homogeneous on this variable to find an effect. Alternatively, people who attend college may be similar, regardless of parental income; or the college environment may produce similar student behavior, regardless of economic background.

Hypothesis six was supported: Being older increased the likelihood of engaging in anal intercourse, even when controlling for the age that people began vaginal intercourse. This suggests that merely having more years of life experience—not specifically coital experience—results in increased anal intercourse.

Seventh was a series of hypotheses related to sensation seeking and risk taking: Some were supported, others not. People reporting engaging in anal sex took more risks than others, although not all possible risks. People who engaged in anal sex were less likely to use contraception and used less reliable means of contraception than people not reporting engaging in anal sex (regression analysis only). They were less likely to have used condoms during the last act of vaginal intercourse than people who did not engage in anal sex: 68.2% of people reporting engaging in anal sex did not use a condom at last coitus, compared to 48.5% of the people not reporting this behavior. People who engaged in anal sex also began vaginal intercourse earlier than those without it; and *in the previous 3 months*, they were more likely to report engaging in vaginal intercourse. These findings indicate that people who report engaging in anal intercourse take risks in several important sectors of their sexual lives.

Zuckerman (1974, 1994) reports data indicating that people who like high levels of sensory stimulation tend to explore sex and drugs—and take more risks

with these activities—than do low sensation seekers. Our study finds that people who had engaged in anal intercourse reported more vaginal sexual partners and used more drugs than people who did not report engaging in this behavior, but both variables were only significant in the correlation analysis, without controls for confounding variables.

Zuckerman (1994) argues that genetics play some role in making people high or low on sensation seeking and risk taking, but nature and nurture both make their contributions. For example, positive reinforcement from peers for doing exciting things increases a person's chances of seeking and enjoying high sensory stimulation, whereas failure, injury, ridicule, or other forms of punishment associated with sensation-seeking behavior can temper or inhibit it (Baldwin and Baldwin, 2001).

In our study, people reporting engaging in anal sex displayed an astonishing lack of concern for the transmission of HIV via anal interactions, judging by the small percentage of time they used condoms during anal intercourse. Although anal intercourse is riskier than vaginal intercourse, condom use averaged only 20.9% of the time for anal intercourse, compared with 42.9% for vaginal intercourse, in the previous 3 months. Only 15.2% of individuals who engaged in anal sex always used condoms for anal intercourse, and 76.1% never did so. In a study of college students, Hutchison (1994, 1996) found that of those who engaged in anal intercourse in the previous 3 months, 26% used condoms 90% to 100% of the time for anal sex, whereas 68% did not use condoms during anal intercourse.

Although most students know intellectually that anal intercourse can transmit HIV and that condoms provide good protection from transmission, they behave *as if* they were ignorant of this. College students can create “illusions of safety” when engaging in risky behavior (Thompson *et al.*, 1996). They can do this by forming reassuring ideas: “I’m in a monogamous relationship so I won’t contract HIV”; “I know my partner’s sexual history”; or “I’d know it if I met a person who was HIV positive and I’d never sleep with that individual.” Such comforting thoughts allow people to rationalize that they are safe, even though the logic is flimsy. If people believe that scientific risk data do not apply to them, why should they worry? We suspect that standard AIDS education has failed to convince many students that they are at risk during anal intercourse because most AIDS education for heterosexuals fails to include open and honest talk about anal sex, based on scientific evidence.

The frequency of condom use during anal intercourse is an important variable, but most other studies on college samples do not specifically collect the relevant data. Some research on noncollege populations finds low condom use for anal intercourse. In a study of young men across the United States, 9% of those who were sexually active engaged in heterosexual anal intercourse in the previous year, but only 20% always used a condom and 60% never did so (Ku *et al.*, 1993). In a household probability sample of California adults, Erickson *et al.* (1995) found that 60% of people who participated in anal intercourse at least once a month in the previous year had never used condoms. In their study of adult clients at an STD

clinic, Baker *et al.* (1995) also found condom use during anal sex to be low: About 25% of people reported engaging in anal intercourse in the previous 3 months, but only 11% always used a condom, and 67% never did so.

In the present study, people reporting engaging in anal intercourse used condoms less frequently during vaginal intercourse in the previous 3 months than did other people: 65.3% of people engaging in anal sex used condoms 25% of the time or less, compared with 45.2% of the people who did not engage in anal sex. Clearly, a substantial percentage of young people are engaging in activities that put them at risk of contracting HIV, and the risk takers would be more likely than others to transmit HIV to a partner during vaginal intercourse because they are less likely to use condoms during vaginal intercourse.

Overall, this and other studies indicate that health educators have not presented enough scientific data to convince heterosexuals about the risks of anal intercourse and the need to abstain from—or use condoms during—this activity. Roughly 20% to 25% of sexually active college students report experience with anal intercourse, but most do not use condoms during this activity. Although some use condoms during vaginal intercourse, they use condoms less often during anal intercourse, which puts them at risk of contracting and transmitting STDs, including HIV. The traditional emphasis of sex education on teaching heterosexuals to abstain from sexual relations or use condoms during vaginal intercourse may not be adequate for communicating the need to use condoms for—or to abstain from—anal intercourse.

Perhaps educators have not been as explicit as is needed about anal sex. If we feel awkward or ashamed to talk openly and candidly about anal sex, we must realize that approximately one-fifth to one-quarter of sexually active young adults are not ashamed to do it. This and other studies suggest that sex education must focus especially on the high sensation-seeking and risk-taking populations. If we fail to talk openly and honestly about anal sex and its serious health risks, we are leaving between one in four and one in five of young adults ill-informed about a behavior they may try.

In the era of AIDS, education about anal intercourse is essential for *all* students, because even those who do not engage in anal interactions can be peer sex educators for others. Everyone needs to know the empirical facts relevant to all serious diseases. For heterosexuals, the risk of vaginal intercourse receives considerably more attention than do risks of anal intercourse, and this may give many students the false impression that anal intercourse is not problematic. We must confront and refute this false impression directly.

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