

PSYCHOLOGICAL PREDICTORS OF SEXUAL BEHAVIORS RELATED TO AIDS TRANSMISSION¹

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Summary.—This study was designed to assess the differential value of several psychological variables with regard to predicting safe-sex behavior. A sample of 94 male and 179 female undergraduate students, ranging in age from 16 to 66 years, were surveyed about sexual issues related to safe-sex practices. The survey included scales measuring participants' knowledge of transmission of AIDS, self-perception of safe-sex communication, fear and concern about AIDS, attitudes toward AIDS victims, and self-report of risky behavior. Several interesting relationships among predictor variables were found. For instance, favorable attitudes toward AIDS victims were positively correlated with knowledge about AIDS transmission, perceived communication with partners about safe sex, and fear of acquiring AIDS. However, only two predictor variables were independently predictive of self-reports of risky sexual behavior; specifically, fear about AIDS transmission was positively correlated with risky behavior, while communication was negatively correlated with risky behavior. These data suggest a need for a model that allows for complex, reciprocal relationships between the cognitive, emotional, and behavioral components of safe-sex practice. Implications are applied to research with college populations.

Although sexual behavior is based on private decisions, the scientific study of sexual behavior is important to address issues such as pregnancy and abortion, contraceptives, and sexually transmitted diseases such as Acquired Immune Deficiency Syndrome (AIDS) (Laumann, Gagnon, Michael, & Michaels, 1994). The transmission of the Human Immunodeficiency Virus (HIV) represents a global pandemic with millions of people being infected with HIV worldwide (Mann & Tarantola, 1995; Vitillo, 1997). Despite the magnitude and impact of this pandemic, Americans do not appear to be actively engaged in AIDS prevention (House & Walker, 1993). Although there have been breakthroughs in drug therapies, challenges associated with these therapies, such as drug interactions, resistance to drugs, cost of treatment, and complex regimens (Deeks, Smith, Holodny, & Kahn, 1997) may render these treatments ineffective.

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In the United States, prevention efforts have focused on education. Despite the hundreds of millions of dollars spent per year, these programs have not increased safe-sex behaviors (Philipson, Posner, & Wright, 1997). Catania, Kegeles, and Coates (1990) suggested that most people in the USA know the risk of AIDS, but knowledge about AIDS acquisition may not be a sufficient condition for safe-sex behavior.

Kirscht and Joseph's (1989) review of the health belief model, as applied to the prevention of AIDS, may offer guidance to researchers and educators who are trying to understand the many interacting variables influencing safe-sex choices. According to this model, perceived susceptibility (perception of risk of contracting AIDS), severity (perception of seriousness of AIDS), and benefits (perceived effectiveness of preventative behavior) should be positively correlated with preventative behaviors while perceived barriers (costs) should be negatively correlated with such behaviors (Yep, 1993). Studies testing these predictions have yielded data both supporting and contradicting the health belief model as applied to HIV transmission (Yep, 1993; Mahoney, Thombs, & Ford, 1995), suggesting the need for a more sophisticated model. In addition to the variables included in the health belief model, Bandura's concept of self-efficacy (1977), or the belief that one has the capacity to produce successful outcomes, has been associated with safe-sex behaviors (Mahoney, *et al.*, 1995). Communication among sexual partners is another variable that has been studied (Gray & Saracino, 1991; Cline, Johnson, & Freeman, 1992; Stebleton & Rothenberger, 1993; Catania, Coates, & Kegeles, 1994; Cline & McKenzie, 1994). Catania, *et al.*'s AIDS risk-reduction model (1990) integrates many factors including components of the health belief model, aspects of efficacy theory, and emotional and interpersonal variables in a description of the process of changing AIDS-risk behaviors. The AIDS risk-reduction model suggests a wide array of variables influencing safe-sex behaviors through the following three aspects of the change process "... (1) labeling of high-risk sexual behaviors as problematic, (2) making a decision to change high-risk behaviors and committing to that decision, and (3) seeking and enacting solutions directed at reducing high-risk activities" (Catania, *et al.*, 1990, p. 68). These aspects are not unidirectional, nonreversible, and not invariant. Thus, the flow of causality can move in all directions (e.g., unsuccessful attempts to enact solutions can influence the labeling process), and alternate paths are possible (e.g., person enacts change due to a partner's request without prior labeling or commitment). Applying the AIDS risk-reduction model involves understanding conditions that influence the various aspects of the change process and using this information to effect change in people at these various points in the change process. For example, Catania, *et al.* (1990) suggested that knowledge of HIV transmission, beliefs of personal susceptibility to contracting HIV, and

aversive emotions (fear and anxiety) are associated with labeling sexual behaviors as problematic. Similarly, aversive emotions and self-efficacy for reducing high-risk behaviors are associated with commitment to change high-risk behavior, while aversive emotions and sexual communication are associated with enactment of reducing risk.

The study of HIV transmission and AIDS was initially targeted to high-risk populations, i.e., the gay community and intravenous drug users (Keeling, 1993). Although more recent data suggest increasing risks of HIV and AIDS for heterosexual women (Douce, 1993; Keeling, 1993) and people of color (Dworkin & Pincu, 1993), there is also a growing concern about the young adult college population in this country. Douce (1993), citing the increasing rate of sexually transmitted diseases on college campuses, concluded that young people are not following safe-sex practices. On some college campuses located in areas of high HIV incidence in the United States, seroprevalence approaches 1% of students (Keeling, 1993). Reflecting the concern about young adult and college student populations, several researchers (Cline, *et al.*, 1992; Mahoney, *et al.*, 1995) have collected information on this population's sexual behaviors.

Gray and Saracino (1989, 1991) surveyed 459 college students about their knowledge, attitudes, beliefs, and behaviors as they relate to HIV transmission and AIDS. Their results indicated that students were generally knowledgeable. However, they found that AIDS was not an issue of personal concern for most students. These researchers found no relationship between students' knowledge of HIV transmission and their sexual behavior.

The purposes of the present study are to replicate and extend previous research on AIDS-related issues among college students by developing measures of psychological variables, e.g., self-perception of safe-sex communication, previously hypothesized to relate to safe-sex behavior (Catania, *et al.*, 1994). An additional goal of this research is to identify predictors of risky behavior. Participants responded to scales designed to measure psychological dimensions relevant to AIDS, such as attitudes, knowledge, communication, fear, and behavior. Multivariate techniques identified patterns between these psychological dimensions and indicated significant predictors of sexually risky behaviors.

METHOD

Participants

Students attending four different colleges and universities in Oregon were asked in their classes or at campus centers to participate in this study. A sample of 94 male and 179 female college students, ranging in age from 16 to 66 years ($M=27.4$, $SD=10.0$), were surveyed about issues related to safe-sex practices. Participants were predominantly Euro-American (90%);

other groups represented in the sample included Hispanic, Latino, or Mexican American (3%); Asian, Asian-American, or Pacific Islander (3%); American Indian or Alaskan Native (2%); Black or African American (1%); with the remaining 1% reporting other racial categories. The majority of participants were heterosexual (97%). In regard to marital status, 52% of the respondents reported being single (never married), 28% reported being currently married, and 20% reported being previously married (widowed, divorced, or separated).

Questionnaire

We modified a questionnaire developed by Gray and Saracino (1989, 1991) and Gray (1993) to obtain information about knowledge, perception of communication, fear of AIDS, and behaviors as they relate to safe-sex practices. Attitudes toward AIDS victims were also assessed. Our survey included questions about demographics, health conditions, medical procedures, and risk beliefs, as well as the five scales listed below. Although all five of these scales were comprised of items from the Gray and Saracino (1989, 1991) and Gray (1993) survey, only the Knowledge of Transmission of AIDS Scale and the Attitudes Toward AIDS Victims Scale were identical to those used in the Gray survey (1993). [Some items on the Gray (1993) Knowledge of Transmission of AIDS Scale were adopted from DiClemente, Zorn, and Temoshok (1987) and Stall and McKusick (1988); all items on the Gray (1993) Attitudes Toward AIDS Victims Scale were from Larsen, Long, and Serra (1998).] The other three scales were created for this study by revising and grouping items from the Gray survey (1993). [Note that Gray (1993) adopted some items we used in the Fear and Concern About AIDS Scale from DiClemente, *et al.* (1987).] Measures of reliability (coefficients alpha) are included in the description of each scale below, but there are no measures of validity. Items of all of the following scales (except for the Attitudes Toward AIDS Victims Scale, which are given in an article by Larsen, *et al.*, 1988) can be found in the Appendix (pp. 64-67).

The Knowledge of Transmission of AIDS Scale ($\alpha = .98$) consists of 37 true-false questions regarding the transmission, symptomology, and prevention of AIDS. This scale had been reviewed by physicians for accuracy and pretested for manageability and face validity.

The Self-perception of Safe Communication Scale ($\alpha = .86$) has 12 items, rated on a 4-point scale, about the likelihood of various kinds of communication with potential sex partners. Response categories were 1: very unlikely and 4: very likely. A participant's overall score could range from 12 to 48, with high scores indicating a greater reported likelihood of safe-sex communication with a potential partner.

The Fear and Concern About AIDS Scale ($\alpha = .64$) of nine items was

rated on a 5-point scale, tapping fear and concern about AIDS. Response categories varied from 1: disagree strongly to 5: agree strongly. A participant's overall score could range from 9 to 45, with high scores indicating a greater reported concern about AIDS.

The Attitudes Toward AIDS Victims Scale (Larsen, *et al.*, 1988) consists of 20 items, rated on a 5-point scale anchored by 1: disagree strongly and 5: agree strongly. A participant's overall score could range from 20 to 100, with high scores indicating a more positive reported attitude toward AIDS victims. The scale has a corrected split-half reliability of .87 and a coefficient alpha of .91 (Larsen, *et al.*, 1988).

The Risky Behavior Scale ($\alpha = .92$) consists of 11 dichotomous (yes/no) questions that tap specific sexual activities of respondents during the previous year. Scores thus ranged from 0 to 11. These items were derived using a primary factor analysis on several such items. To measure risky behavior, participants answered questions related to two *a priori* classes of recent sexual behavior: safer kinds of sexual practices, e.g., mutual masturbation, and riskier kinds of practices, e.g., unprotected vaginal intercourse. The factor analysis indicated that, generally, items from both these subscales were highly intercorrelated and comprised one strong and reliable factor (eigenvalue = 5.24). Thus, the primary risk behavior variable consisted of a sum of these items. Three other factors with eigenvalues greater than 1 were extracted. However, this first factor was comprised of items that made for a clearly interpretable risky behavior scale; the other factors were difficult to interpret in addition to accounting for less variability (each accounted for less than 23% of the variability in the scale).

Procedure

Students were given a description of the research project and were asked to participate voluntarily in completing the survey. All completed surveys were collected to guarantee the anonymity of participants.

First, a general picture of the participants was generated by summarizing characteristics, such as number of partners and measures of unprotected sex, that are typically associated with AIDS and HIV transmission. Next, several variables pertaining to different psychological dimensions related to AIDS were assessed. These dimensions included (a) Attitudes Toward AIDS Victims, (b) Fear and Concern About AIDS, (c) Knowledge of Transmission of AIDS, (d) Self-perception of Safe Communication, and (e) Risky Behavior. Table 1 below presents descriptive statistics and reliability coefficients for the scales that measured these dimensions. Sex differences on these different variables were assessed using a multivariate analysis of variance. Next, zero-order correlations were computed to assess general patterns of relationships between the different measures. A standard multiple regression analy-

sis was conducted to identify the best independent predictors of tendencies to engage in risky behaviors. Also, a multivariate analysis of variance was computed based on data collected exclusively from nonmarried individuals. This analysis was designed to assess whether nonmarried individuals, who reported different patterns of condom use, differed in terms of their knowledge, attitudes, fears, and communication patterns.

RESULTS

Summary of Background Characteristics Associated with AIDS and HIV Transmission

Participants responded to several questions pertaining to their personal beliefs and histories with regard to HIV. In terms of certain characteristics, our participants' responses indicated relatively low risk. For instance, on a self-evaluation measure of personal risk of acquiring AIDS, a majority (82%) of respondents reported themselves as at low or no risk. Also, approximately one-third (32%) agreed that they would be very likely to have themselves and their partners tested. Indeed, 34% of respondents indicated that they had been tested for the AIDS virus antibody. In all, 21% of participants reported having multiple sex partners. Further, 81% reported that they would be likely to insist on using a latex condom when having sexual intercourse; however, responses on other items portrayed participants as being at relatively *high* risk for HIV. For instance, 72% indicated having engaged in vaginal intercourse without condoms. Also, approximately two-thirds (68%) reported having engaged in unprotected oral sex.

Sex Differences in AIDS-relevant Psychological Variables

To assess whether sex differences were generally manifested across the five primary measures employed in this research, a multivariate analysis of variance was computed with sex as an independent variable and five measures (described above) employed as dependent variables. This analysis gave multivariate significance (Wilks $\lambda = .80$, $F_{5,219} = 10.62$, $p < .01$). In other words, a significant amount of variability in this set of responses was accounted for by sex differences. (See Table 1 for means and standard deviations on each of these variables by sex.)

Of five F ratios calculated to assess univariate significance, three were significant. Specifically, significant sex differences were obtained for scores on (a) Attitudes Toward AIDS Victims ($F_{1,223} = 31.39$, $p < .01$), (b) Fear and Concern About AIDS ($F_{1,223} = 9.95$, $p < .01$), and (c) Self-perception of Safe Communication ($F_{1,223} = 21.99$, $p < .01$). Thus, compared with males, females in the present sample tended to describe themselves as having more positive attitudes toward AIDS victims and more personal concerns regarding acquiring HIV themselves. Also, females perceived themselves as more likely to

TABLE 1
MEANS, STANDARD DEVIATIONS, *ns*, *qs*, AND *t* TESTS ASSESSING
SEX DIFFERENCES FOR SCORES ON ALL MEASURES

Measure	<i>M</i>	<i>SD</i>	<i>n</i>	α	<i>t</i>
Attitudes Toward AIDS Victims					
All Participants	74.16	13.48	276	.91*	
Males	68.76	12.78	89		5.26†
Females	77.50	12.70	173		
Fear and Concern About AIDS					
All Participants	33.51	4.98	289	.64	
Males	32.49	4.74	93		3.17†
Females	34.34	4.45	179		
Knowledge of Transmission of AIDS					
All Participants	34.73	2.56	288	.98	
Males	34.95	2.20	94		.64
Females	34.75	2.58	178		
Self-perception of Safe Communication					
All Participants	35.45	8.21	244	.86	
Males	32.27	8.18	85		4.87†
Females	37.41	7.56	151		
Risky Behavior					
All Participants	6.71	3.45	273	.92	
Males	7.05	3.52	94		1.20
Females	6.53	3.40	179		

*Based on data collected from Larsen, Long, and Serra (1988). † $p < .01$.

communicate about safe sex with potential partners. However, males and females were generally similar to each other in terms of their responses on Knowledge of the Transmission of AIDS and in terms of their scores on the Risky Behavior Scale.

Correlations Between Primary Variables

Zero-order correlations were computed (see Table 2). While these correlations were generally quite modest in magnitude (the largest correlation was .28), several interesting relationships were observed in these analyses. Participants' scores on Attitudes Toward AIDS Victims were significantly related to several other variables, specifically, Fear and Concern About AIDS ($r_{276} = .28, p < .01$), Self-perception of Safe Communication ($r_{233} = .26, p < .01$), and Knowledge of the Transmission of AIDS ($r_{274} = .25, p < .01$). Scores on Fear and Concern About AIDS were positively correlated with Self-perception of Safe Communication ($r_{243} = .18, p < .01$) and Risky Behavior ($r_{289} = .23, p < .01$).

Predicting Participants' Self-report of Tendencies to Engage in Risky Behavior

To assess which variables are independently predictive of the tendency to engage in risky sexual behavior, a standard multiple regression analysis

TABLE 2
ZERO-ORDER CORRELATIONS BETWEEN PRIMARY VARIABLES

Variable	1	2	3	4	5
1. Attitudes Toward AIDS Victims					
2. Fear and Concern About AIDS	.28†				
3. Self-perception of Safe Communication	.26†	.18†			
4. Knowledge of Transmission of AIDS	.25†	.05	.11		
5. Risky Behavior	-.01	.23†	-.17†	.13*	

* $p < .05$. † $p < .01$.

was conducted. Predictor variables included Attitudes Toward AIDS Victims, Fear and Concerns About AIDS, Self-perception of Safe Communication, and Knowledge of Transmission of AIDS.

A significant amount of variability in Risky Behavior was predicted by the set of predictor variables employed ($R^2 = .07$, $F_{4,24} = 4.26$, $p < .01$; see Table 3). Two variables independently accounted for a significant amount of variability in Risky Behavior scores: Fear and Concern About AIDS ($sr^2 = .03$, $p < .01$) and Self-perception of Safe Communication ($sr^2 = .03$, $p < .01$). Despite significance, neither Fear and Concern About AIDS nor Self-perception of Safe Communication is particularly predictive of Risky Behavior.

TABLE 3
MULTIPLE REGRESSION ANALYSIS PREDICTING PARTICIPANTS' SELF-REPORTED TENDENCY TO ENGAGE IN RISKY SEXUAL BEHAVIOR (RISKY BEHAVIOR SCORES)

Predictor Variable	B	β	sr^2	t
Attitudes Toward AIDS Victims	-.02	-.07	.00	-1.00
Fear and Concern About AIDS	.14	.19	.03	2.82*
Self-perception of Safe Communication	-.08	-.20	.03	-2.90*
Knowledge of Transmission of AIDS	.17	.12	.01	1.78
Constant	.46			.13
			$R^2 = .07$	
			R^2 (adjusted) = .05	
			R = .27*	

* $p < .01$.

Predicting Condom Usage

Participants who were not married at the time of the study were divided into one of four groups depending on their reported sexual activity in the past year: (a) participants who never engaged in vaginal or anal intercourse (Abstainers; $n = 56$), (b) participants who engaged in vaginal intercourse only with condoms (Condoms-Always; $n = 13$), (c) sexually active participants who never used condoms during intercourse (Condoms-Never; $n = 48$), and (d) participants who engaged in sexual intercourse both with and

without condoms (Condoms-Sometimes; $n=78$). A multivariate analysis of variance designed to assess differences in the primary variables as a function of condom usage was computed. The specific dependent variables employed were Attitudes Toward AIDS Victims, Knowledge of Transmission of AIDS, Fear and Concern About AIDS, and Self-perception of Safe Communication.

The test was significant (Wilks $\lambda = .81$, $F_{12,424} = 2.54$, $p < .01$). Univariate significance across the different condom statuses was only obtained for the communication variable ($F_{3,163} = 6.67$, $p < .01$). Nonmarried participants who had not engaged in vaginal or anal intercourse scored higher on the Self-perception of Safe Communication Scale than participants in any of the other condom-usage categories. The mean score for these 44 participants² was 39.27 ($SD=6.16$) which was significantly higher than the mean score for the 46 participants² who had only engaged in sexual activity without condoms ($M=32.76$, $SD=7.55$; $t_{86} = 4.49$, $p < .01$), as well as significantly higher than the mean score for 71 participants² who had engaged in sexual activity both with and without condoms ($M=34.83$, $SD=6.61$; $t_{96} = 3.65$, $p < .01$). While the 13 individuals² who had had sexual intercourse only with condoms also, on average, scored lower on Self-perception of Safe Communication ($M=35.77$, $SD=7.35$) than those who reported abstaining from sex, this difference was not significant. Notice that the order of groups from highest to lowest in Self-perception of Safe Communication is as follows: Abstainers, Condoms-Always, Condoms-Sometimes, and Condoms-Never. This pattern suggests that the more open the people are to partner communication, the less their risk in terms of reporting unprotected sex.

DISCUSSION

Contradictions Between Risk Indices

The participants appeared to be at low risk for AIDS on some indicators and at higher risk on other measures. Risk patterns of these students were similar to those reported by other investigators for college student participants. As part of their low-risk profile, our participants were generally informed about AIDS and HIV transmission (averaging 95% on the Knowledge of Transmission of AIDS Scale) as were other college students (Gray & Saracino, 1989, 1991; DiClemente, Forrest, & Mickler, 1990; Hollar & Snizek, 1996). Also, in the direction of lower risk, one-third of our respondents indicated that they had been tested for AIDS, and 32% of them, compared to only 4% of Gray and Saracino's participants (1991), agreed that they would be very likely to have themselves and their partners tested. Other re-

²The n s for these t tests differ slightly from those presented concerning number of participants in the different groups due to missing data.

cent findings (Simkins, 1995; Hammer, Fisher, Fitzgerald, & Fisher, 1996) have indicated a positive attitude toward testing in undergraduates. A final indicator of low risk for our students was that only a minority of respondents (21%) reported multiple sex partners in the past year.

However, other characteristics of our sample placed them at higher risk for AIDS. Similar to other college students (Gray & Saracino, 1989, 1991; Manning, Balson, Barenberg, & Moore, 1989; Yep, 1993), our participants did not perceive themselves as being at risk for AIDS. The extant literature has included conflicting findings regarding the relationship between perception of risk and risky behaviors; some research has indicated perception of risk to be positively related to risk behaviors, while other research has shown the opposite (Catania, *et al.*, 1990). Thus, the meaning of perceptions of low risk for AIDS in our sample is unclear for participants' actual risk factor.

Further, a majority of our respondents indicated participating in oral sex during the past year, which is another indicator of risk for HIV in our participants, given that current findings (Spitzer & Weiner, 1989; Lifson, O'Malley, Hessol, Buchbinder, Cannon, & Rutherford, 1990; Lane, Holmberg, & Jaffe, 1991) suggest that HIV can be transmitted during unprotected oral sex. Also, the factor analysis of the reported sexual behaviors in our sample suggests that engagement in seemingly qualitatively different kinds of sexual behaviors are highly intercorrelated. Thus, ironically, engaging in safer-sex behaviors may be significantly predictive of engaging in riskier sexual behaviors as well. This finding may simply mean that the more active students are sexually, the greater the chance of both safe and risky behaviors.

Our respondents' self-reported likely insistence on using latex condoms indicated a positive attitude toward condoms; however, their self-reports of inconsistent condom use (72% indicated unprotected sex) appear contradictory to this positive attitude. Specifically, the self-reports of nonmarried participants indicated that 7% always used condoms, 25% never used condoms, and 40% sometimes used condoms during sexual activity. Consistent with our findings, a review of the literature indicates that a positive attitude toward condoms is prevalent among college students (Severn, 1990; Thompson, Anderson, Freedman, & Swan, 1996) but that inconsistent condom use is also typical (Gray & Saracino, 1989, 1991; McCormack, Anderton, & Barbieri, 1993; Hollar & Snizek, 1996).

Earlier studies have indicated that contradictions between self-reported predictions of condom use and self-reported condom-use behavior may be explained by barriers to condom use. Some suggested barriers to condom use include perceptions of invulnerability to AIDS (Gray & Saracino, 1989, 1991; Manning, *et al.*, 1989; Yep, 1993) and an association of condom use with casual sex as opposed to intimate relationships (Hammer, *et al.*, 1996). Also, our sample's higher risk in terms of reporting vaginal intercourse with-

out condoms compared to reporting multiple sexual partners might be related to Yep's conclusion (1993) that undergraduates preferred sexual exclusivity over condom use for HIV protection because monogamy has stronger sexual norms and social traditions and requires less explicit communication and fewer behavioral skills.

Thus, our results, consistent with the findings of others, suggest that college students have an HIV-risk profile characterized by contradictions. They are very knowledgeable about HIV transmission and oriented to safe-sex in terms of their reported numbers of partners and their attitudes toward HIV testing and condom use; yet unprotected sex seems to be normative in this sample.

Sex Differences in AIDS-relevant Psychological Variables

In addition to identifying risk patterns in our sample, our analysis indicated sex differences for several dimensions, which were consistent with previous findings. Our results are consistent with previous research findings indicating that women, as compared to men, have more AIDS-related fears and concerns (Cline & McKenzie, 1994), report better communication with partners (e.g., Cline, *et al.*, 1992), and are more positive toward AIDS victims (Gray & Saracino, 1991; Cline & McKenzie, 1994).

Relationships Between AIDS-relevant Psychological Variables

Our results not only suggested a complex pattern of risk indicators in our sample and sex differences for several variables, but also an interesting pattern of correlations between AIDS-related dimensions measured in this research. Attitudes Toward AIDS Victims were positively correlated with Fear and Concern About AIDS and Self-perception of Safe Communication. Also, consistent with Gray and Saracino's finding (1991), these attitudes were also positively correlated to Knowledge of Transmission of AIDS. As holding positive attitudes toward AIDS victims is associated with the aforementioned characteristics that should, conceptually, decrease an individual's chances of contracting the disease, more research on how attitudes toward AIDS victims relates to other risk factors is recommended. Scores on the Knowledge of Transmission of AIDS Scale were not correlated with Fear and Concern About AIDS scores or Self-perception of Safe Communication scores. Thus, knowledge appears to play a limited role in these other psychological characteristics pertaining to AIDS. A positive correlation was found between Fear and Concern About AIDS and Self-perception of Safe Communication, indicating a relationship between communication processes and emotional aspects of AIDS-related functioning.

Psychological Predictors of Self-reported Tendencies to Engage in Risky Behavior

The Fear and Concern About AIDS variable accounted for a significant

(albeit relatively small) amount of variability in Risky Behavior with higher fear and concern about AIDS being associated with self-reports of riskier behavior. Recall that previous literature indicated that measures of perception of AIDS-risk have been associated both positively (Breakwell, Millward, & Fife-Schaw, 1994) and negatively (Catania, *et al.*, 1990) with high-risk behavior. Also, Catania, *et al.* (1990) suggested the possibility of a curvilinear relationship between aversive emotions and AIDS-risk reduction. Thus, anxiety may facilitate the decision to change one's behavior, but extremely high distress associated with expectations of failure may undermine such commitment to behavioral change.

The communication variable accounted for a significant (albeit small) amount of variability in Risky Behavior. Lower Self-perception of Safe Communication scores were associated with self-reports of riskier behavior. Also, Self-perception of Safe Communication accounted for a significant amount of condom usage for nonmarried participants. The pattern of means for these groups indicated that the higher the group's communication score the lower the group's risk in terms of reported unprotected sex. Catania, *et al.* (1994) also found that high health protective sexual communication was associated with high condom use.

Conclusions and Implications

Our results suggest a complex, and, in some instances, contradictory, pattern of risk indicators and relationships between AIDS-relevant variables. These patterns indicate a need for revision of past models of safe sex. Research systematically investigating the AIDS-risk reduction model should continue as this model integrates elements from the health-belief model, aspects of efficacy theory, emotional influences, and interpersonal processes, and calls for all influencing variables to be organized around when and how they influence the change process (Catania, *et al.*, 1990). For example, Catania, *et al.* (1990) suggest that inconsistencies in the literature on the relationship between measures of perception of AIDS-risk and high-risk behaviors may be due to failure to consider how perceptions of risk influence the risk-reduction process (problem labeling, commitment to risk reduction, and behavioral enactment) described in the AIDS risk-reduction model. Researchers should continue to examine the contradictions among risk indicators for college student populations and to study the relationships between AIDS-relevant variables.

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APPENDIX: SCALES

TABLE A1
THE KNOWLEDGE OF TRANSMISSION OF AIDS SCALE

No.	Content of Item
1.	Use of a condom during intercourse is likely to prevent the transmission of the Human Immunodeficiency Virus (HIV).
2.	HIV can be present in vaginal fluid.
3.	Unprotected heterosexual intercourse carries a risk of transmitting HIV from a man to a woman.
4.	Unprotected heterosexual intercourse carries a risk of transmitting HIV from a woman to a man.
5.	HIV can be transmitted by anal intercourse.
6.	HIV can be transmitted in semen.
7.	A person can contract HIV through oral-genital sex.
8.	Receiving a blood transfusion with infected blood can give a person HIV.
9.	You can get HIV by sharing a needle with a drug user who has the disease.
10.	You can tell a person has AIDS by looking at him or her.
11.	HIV can be spread by using someone else's comb or hairbrush.

(continued on next page)

TABLE A1 (CONT'D)
THE KNOWLEDGE OF TRANSMISSION OF AIDS SCALE

No.	Content of Item
12.	AIDS is a medical condition in which the body has a difficult time fighting off infection.
13.	You can get HIV from casual contact (such as shaking hands, coughing, using the same telephone or toilet seat) with people who have the disease.
14.	Some babies born to mothers with HIV will test positive even after developing their own immune system.
15.	Stress causes HIV.
16.	If you kiss someone with HIV, you will get the disease.
17.	The majority of gay men in the world have HIV.
18.	If you touch someone with HIV without exchanging bodily fluids you can get HIV.
19.	What you eat can give you HIV.
20.	HIV can be cured.
21.	HIV is not at all serious; it is like having a cold.
22.	AIDS is caused by bacteria.
23.	People can avoid getting HIV by exercising regularly.
24.	Having unprotected sexual intercourse with someone who has HIV is one way of getting it.
25.	The majority of people with HIV have died from the disease within 10 years of being diagnosed.
26.	The majority of lesbian women have HIV.
27.	People with AIDS usually develop diseases as a result of their deficient immune system.
28.	AIDS is caused by the same bacteria that causes gonorrhea.
29.	You can get AIDS from sharing plates, forks, or glasses with someone who has HIV.
30.	There is a vaccine available which prevents HIV.
31.	You can get AIDS from mosquitos, flies, or ants.
32.	If you swim in a pool with someone who has AIDS, you will get the disease.
33.	A person who is infected can infect others, even if no symptoms are present.
34.	Sharing needles or syringes, even once, is a very easy way to be infected by HIV.
35.	HIV can enter the bloodstream through cuts on tissue in the vagina, penis or rectum.
36.	Birth control pills protect against HIV.
37.	The AIDS virus makes a person's body unable to protect itself from diseases that rarely affect healthy people.

Note.—Participants gave a response of true or false to all items. Some items from "The Association of Gender, Ethnicity, and Length of Residence in the Bay Area to Adolescents Knowledge and Attitudes About Acquired Immune Deficiency Syndrome," by R. J. DiClemente, J. Zorn, and L. Temoshok (1987), *Journal of Applied Social Psychology*, 17, 221-222. Copyright 1987 by V. H. Winston & Sons, Inc. Reprinted with permission from the *Journal of Applied Social Psychology*, 17(3), 216-230. ©V. H. Winston & Son, Inc., 360 South Ocean Boulevard, Palm Beach, FL 33480. All rights reserved. Adapted with permission of the authors. All items from "Survey on HIV/AIDS: Oregon State University Students," by L. A. Gray, 1993, Unpublished manuscript, Oregon State University Counselor Education Program. Adapted with permission of the author.

TABLE A2
THE SELF-PERCEPTION OF SAFE COMMUNICATION SCALE

No.	Content of Item
1.	Ask how many sexual partners he/she has had.
2.	Discuss using a condom before having sexual intercourse.
3.	Ask if he/she has used drugs intravenously (with a needle).
4.	Ask if he/she has had a sexual relationship with an intravenous drug user.
5.	Try to guess if he/she has been exposed to AIDS.
6.	Ask if he/she has been exposed to AIDS.
7.	Have both of us tested for AIDS.
8.	Ask to have a monogamous relationship.
9.	Take fewer precautions with someone who seems like the kind of person who would not be infected.
10.	Ask if the person has had a sexual relationship with a gay man.
11.	Ask if the person has been tested for AIDS.
12.	Insist on using a latex condom when having intercourse.

Note.—Participants were asked to consider the above items as some things they may do with potential sex partners and then indicate their likelihood of doing each of them from the following response categories: very unlikely, somewhat unlikely, somewhat likely, or very likely. All items from "Survey on HIV/AIDS: Oregon State University Students," by L. A. Gray, 1993, Unpublished manuscript, Oregon State University Counselor Education Program. Adapted with permission of the author.

TABLE A3
FEAR AND CONCERN ABOUT AIDS SCALE

No.	Content of Item
1.	I am afraid of getting AIDS.
2.	I have heard enough about AIDS and I don't want to hear any more about it.
3.	I am not likely to get AIDS.
4.	If a free blood test was available to see if a person has the AIDS virus, I would take it.
5.	I'd rather get any other disease than AIDS.
6.	It is important that students learn about AIDS in college classes.
7.	I am willing to use latex condoms during sex.
8.	I am willing to refrain from unsafe sexual activity that might expose me to AIDS.
9.	AIDS does not concern me.

Note.—Participants were asked to indicate their agreement with each of the above items from the following response categories: disagree strongly, disagree, no opinion, agree, and agree strongly. Some items from "The Association of Gender, Ethnicity, and Length of Residence in the Bay Area to Adolescents Knowledge and Attitudes About Acquired Immune Deficiency Syndrome," by R. J. DiClemente, J. Zorn, and L. Temoshok (1987), *Journal of Applied Social Psychology*, 17, 223. Copyright 1987 by V. H. Winston & Sons, Inc. Reprinted with permission from the *Journal of Applied Social Psychology*, 17(3), 216-230. ©V. H. Winston & Son, Inc., 360 South Ocean Boulevard, Palm Beach, FL 33480. All rights reserved. Adapted with permission of the authors. All items from "Survey on HIV/AIDS: Oregon State University Students," by L. A. Gray, 1993, Unpublished manuscript, Oregon State University Counselor Education Program. Adapted with permission of the author.

TABLE A4
THE RISKY BEHAVIOR SCALE

No.	Content of Item
1.	Wet kissing (French kissing).
2.	Gave or received body massage.
3.	Hugged and cuddled.
4.	You masturbated a partner with your hand.
5.	A partner masturbated you with a hand.
6.	Performed oral sex on a partner.
7.	Partner performed oral sex on you.
8.	Have you or your partner withdrawn from unprotected (no condom) vaginal intercourse before ejaculation?
9.	Had vaginal intercourse without condoms.
10.	Had vaginal intercourse with condoms.
11.	Have you or your partner had unprotected (no condom) vaginal intercourse during the menstrual period?

Note.—Participants were asked to indicate whether they had participated in each of the above sexual activities during the last year by responding with a “yes” or “no.” All items from “Survey on HIV/AIDS: Oregon State University Students,” by L. A. Gray, 1993, Unpublished manuscript, Oregon State University Counselor Education Program. Adapted with permission of the author.