

Parent and Peer Communication Effects on AIDS-Related Behavior Among U.S. High School Students

By Deborah Holtzman and Richard Rubinson

Data from a 1989 national probability sample of 8,098 high school students in the United States indicate that young people's discussions about the human immunodeficiency virus (HIV) with parents and with peers are highly correlated and have opposite effects on behavior: Students who discussed HIV with their parents were less likely than those who did not to have had multiple sex partners, to have had unprotected sexual intercourse and to have ever injected drugs; on the other hand, students who discussed HIV with their peers were more likely than those who did not to have had multiple partners and to have had unprotected sexual intercourse. Subgroup analyses show that young women were influenced more by HIV discussions with parents, while young men were influenced more by discussions with peers; some communication effects differed by race and ethnicity. Students who received HIV instruction in school were more likely to have talked about HIV with both parents and peers. (Family Planning Perspectives, 27:235–240 & 268, 1995)

Over the past 25 years, a great deal of research has accumulated on the sexual and contraceptive behavior of adolescents in the United States. The impetus for much of the research stems from the negative consequences of early sexual intercourse, such as unintended pregnancies and infection with sexually transmitted diseases (STDs), including the human immunodeficiency virus (HIV). These consequences, in turn, often cause serious health problems, which are accompanied by significant social and economic costs.¹

Many researchers focus on family influences in their attempts to understand adolescent sexual behavior. Within this context, communication between parents and their children about sexual issues and the impact of this communication on adolescent sexual behavior has been one important research area. While some studies show that parental discussions on sexual matters either delay sexual debut or encourage contraceptive use among adolescents, others show no effect. In fact, some studies suggest that communication with parents may encourage sexual behavior. The data also show that these relationships depend on factors such as who reports the communication, whether the parents hold traditional or liberal attitudes, the sex of the adolescent, which parent conducts the

discussion and whether the outcome is sexual debut or contraceptive use. Differences in research designs, study populations and the measures used also may account for some of the divergent findings.

Parent Communication Studies

In one early study of teenage parenthood that collected data on mother-daughter discussions about sex and birth control from 404 predominantly black, pregnant adolescents under age 18,² communication described as casual and oblique nonetheless had an impact on the daughters' behavior: Among the young women who reported discussing birth control with their mothers, 52% had ever used a contraceptive method, compared with 23% among those who did not have such discussions. In addition, in an analysis of 449 black and white 14–15-year-olds and their mothers,³ the researchers found that direct verbal communication about sex and birth control was associated with both a delay in the onset of sexual activity and with more responsible sexual behavior after the daughters became sexually active. Another longitudinal study involved a racially diverse sample of sexually active adolescents attending family planning clinics.⁴ It showed that although 39% said they usually discussed sex and birth control with their mothers, there was no association between communication about sex or birth control and actual contraceptive practice at three points in time.

Findings from a nonrepresentative sample of nearly 500 white 12–16-year-olds

and their mothers showed that adolescents whose mothers reported in 1980 that they had discussed sex with their daughters were only half as likely to have had intercourse by 1982 as were those whose mothers did not report such communication; the study revealed no significant association with the daughters' reports of communication.⁵ Moreover, adolescents who reported that their mothers had discussed contraception with them were about three times as likely to have used an effective method at last coitus as were those who did not report such discussion, although there was no such association between use of an effective method and the mothers' reports of communication.

In a racially mixed sample of almost 500 male and female 15–16-year-olds surveyed as part of the 1981 National Survey of Children, adolescents who reported being able to discuss sexual matters with their parents were less likely to be sexually active than those unable to discuss such subjects with their parents.⁶ Data from the same survey involving 461 white 15–16-year-olds revealed that daughters of parents with traditional family values who reported discussing sex were significantly less likely to be sexually active than were those who did not report such discussions; sons of traditional parents were more likely to be sexually active if they discussed sex with their parents.⁷ On the other hand, use of another measure of communication—whether sons felt that parents often listened to them and discussed parental decisions with them—showed that among those whose parents espoused traditional values, sons who felt this way were less likely to be sexually active.

According to student reports from a randomly selected sample of 349 college students aged 18–24 and their parents, talking to a parent about sex increased the likelihood of engaging in premarital sexual behavior; this relationship, held, however, only among young women whose parents had relatively permissive (liberal) attitudes toward sex.⁸ When the outcome was contraceptive behavior, young men with sexually liberal parents were more likely to use an effective method if they had discussed sex with their parents than similar young men who had not held such discussions.

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However, according to parent reports of discussions, greater family communication on sex increased the likelihood that young women, regardless of whether their parents held liberal or conservative attitudes, would engage in sexual intercourse.

Data from a sample of 113 primarily black, urban high school students indicate that the quality of communication with parents about sexual issues did not differ among the sexually experienced and non-experienced, but that sexually active students who practiced contraception had significantly higher quality communication with parents than those who did not use contraceptives.⁹ Moreover, a survey of 210 pairs of parents with a child aged 12–16 years showed a significant negative relationship between discussions about premarital sex and the teenager's sexual behavior, but only for discussions with the mother.¹⁰ Mothers, however, were more likely than fathers to engage in conversations discouraging premarital sex.

Few studies have explicitly examined family communication within the context of HIV infection or AIDS. One that investigated the relationship between parental support (which included a communication component) and HIV risk behavior among a sample of 10th-grade students who lived near an area of high AIDS prevalence, found that students with the least parental support were five times more likely to engage in high-risk behaviors than those with the most parental support.¹¹

In another study among two convenience samples of adolescents, one that did not directly measure parent-adolescent communication but did include other parenting variables, family organization was strongly associated with high-risk sexual behavior.¹² Data from one sample indicated that adolescents with limited family availability and low levels of parental monitoring and support were more likely to engage in high-risk behavior, and among those who had had sex in the past year, adolescents with less family availability and less parental monitoring and support were less likely to use

condoms. Data from the second sample indicated that those who engaged in high-risk sexual behavior reported less family availability, more coercive family exchanges and less parental support. Furthermore, among the sexually active, those whose families were less available to them were less likely to use condoms.

Self-reported data from a nonrepresentative sample of 1,033 high school students attending 13 California schools showed that compared with students who did not communicate with their parents about sex, those who did had fewer pregnancies, were less likely to be sexually experienced and were more likely to have attempted to avoid HIV infection (by using condoms and decreasing the number of sex partners).¹³

Peer Communication Studies

Even though adolescents are as likely to discuss sexual behavior and HIV issues with their peers as they are with their parents, peer communication studies are more limited. In one longitudinal peer-network study of black and white adolescents in four public schools, sexual behavior was influenced by the sexual behavior of one's best friends, but only among young white women.¹⁴ Data from the same study also indicated that sexual behavior was predicted by the sexual behavior of both the adolescent's siblings and best friends, again particularly among the young women in the sample.¹⁵

Four studies specifically examined the influence of peers on adolescent risk behavior for HIV infection. The first found that high-risk sexual behavior was significantly more likely among adolescents whose friends had engaged in problem behavior and had relatively higher levels of alcohol use; in addition, sexually active adolescents who rarely used condoms had friends who drank relatively more alcohol than others.¹⁶ The second study suggested that adolescents who made no attempt to avoid AIDS were less likely than those who did to perceive that their peers were using birth control.¹⁷

A third survey, conducted in 1988 among 112 adolescents in a San Francisco detention facility, found that adolescents who discussed AIDS with their sex partners were significantly more likely to use condoms consistently than those who did not.¹⁸ And a fourth study, among a convenience sample of 351 blacks aged 9–15 living in public housing, found that more than one-third of the sample perceived that most of their close friends were sexually active, and this perception was more common among the sexually active

and among the sexually nonexperienced who were anticipating having sex in the next six months.¹⁹ One-third of these preadolescents and young teenagers, especially those who had used condoms, believed that most of their friends who were sexually active also used condoms.

Overall, the accumulated data suggest that parent-child communication about sexual issues does have an impact on adolescent sexual behavior and, at least for daughters, it may serve to delay sexual intercourse or encourage contraceptive use among the sexually active. The few studies that specifically investigated the effects of parental communication within the context of HIV infection support the idea that such communication decreases the likelihood that adolescents will engage in high-risk behaviors. For peer communication on sexuality, the more limited evidence suggests that adolescents are influenced by both their perceptions and by the reality of their peers' behavior. However, as has been noted, peer effect tends to increase the likelihood of engaging in sexual intercourse or unprotected sex,²⁰ an effect opposite to that usually exerted by parents.

Reviewing the effects of communication on adolescent sexual behavior related to HIV risk raises the same theoretical and empirical issues found in studies of adolescent smoking and drug use.²¹ Theories that emphasize the socialization effects of significant others—primarily parents and peers—seem to be the most useful in explaining the mechanisms of influence.²² But understanding which socialization theories are most useful requires more extensive studies of the empirical patterns of these behaviors. The study we describe in the remainder of this article was designed to contribute to that systematic empirical mapping.

Data and Methods

The data for our analysis come from the 1989 Secondary School Student Health Risk Survey, conducted by the Centers for Disease Control and Prevention.* The survey was designed to measure the prevalence of HIV-related knowledge, beliefs and behaviors among U.S. high school students. The survey also included items on whether students had received HIV instruction in school and had ever talked to their parents or peers about AIDS and HIV infection.[†]

A multistage design was employed to obtain a probability sample of all 9th–12th grade public and private school students in the United States, including the District of Columbia, Puerto Rico and the Virgin Islands. At the first stage, 1,921 primary sam-

*While more recent surveys (specifically the 1990, 1991 and 1993 Youth Risk Behavior Surveys) asked similar questions of high school students, they did not include all of the variables specified in the models tested in our analysis. Most importantly, they did not include a measure of communication with peers. In addition, measures of HIV knowledge differed among studies that collected data on HIV knowledge (the 1990 survey did collect such data while the 1991 and 1993 surveys did not).

†The communication questions were as follows: "Have you ever talked about AIDS/HIV infection with your parents or other adults in your family?" and "Have you ever talked about AIDS/HIV infection with a friend?"

pling units, consisting of large counties or groups of smaller counties, were selected and stratified by region and extent of urbanization. Fifty of these sampling units were then selected, and from these, 50 counties. From selected counties, 122 schools were chosen to participate in the survey. (At each stage, the selection process was random, with probability proportional to the school's enrollment size.) Finally, within each selected school, one or two classes of a required subject were randomly selected from each of the four grade levels. Schools with large black and Hispanic enrollments were oversampled to ensure adequate numbers of students in these two groups. Additional information about the survey design is available elsewhere.²³

During spring 1989, students completed a 39-item, self-administered questionnaire in the classroom under the supervision of trained data collectors. The questionnaire was designed for a seventh-grade reading level, parent and student consent was obtained prior to administration, and respondents' anonymity was assured.

Our analysis uses as independent variables the following data collected in the questionnaire—communication with parents or other adult family members about AIDS or HIV infection; communication with peers about AIDS or HIV infection; HIV knowledge; and demographic characteristics such as age, race and ethnicity, and gender. Each communication variable was measured by a single question with a yes or no response. HIV knowledge was a summed score based on the number of correct responses to 17 items.

Dependent variables included the number of lifetime sex partners (ranging from none to four or more), ever injecting drugs (yes or no) and a measure of unprotected sexual intercourse (ranging from never having had sexual intercourse to having intercourse but never using condoms). After controlling for age, race and ethnicity, and gender, we assessed the relationships among the variables by multiple regression. We tested three specifications for each behavioral outcome—the effect of parental communication on the behavior, the effect of peer communication on the behavior and the simultaneous effects of parental and peer communication. If parental and peer communication are correlated, and if each has an effect on adolescent sexual behavior, then both should be included in the models at the same time.

Previous research has shown both gender and racial and ethnic differences in parental communication patterns about AIDS in particular²⁴ (and about sexual

matters in general²⁵), as well as differential effects of communication on adolescent behavior, depending on the gender and race and ethnicity of the adolescent.²⁶ Thus, we stratified the sample both by gender and by race and ethnicity, and tested the effects within subgroups. Finally, we examined the relationships between HIV instruction and communication with parents and with peers. We used computer programs specifically designed to analyze complex survey data;²⁷ all data were weighted to account for the probability of selection and nonresponse.

Our analysis allows us to consider four empirical issues. First, what are the relative influences and the direction of effects of communication with parents and with peers? For example, do the effects of parental and peer communication go in opposite directions, as has been suggested by prior research?²⁸ Second, do the effects of communication differ by gender, so that young men and women are affected differently by parental and peer communication? Third, do the effects of communication differ by race or ethnicity? Finally, what are the effects of school-based education (specifically HIV instruction) on these relationships?

We hypothesize that students who report having had discussions about HIV with their parents or other adults in their family will be less likely than those who had not to engage in HIV-related risk behaviors, and that students who report having discussed HIV with their peers will be more likely to report HIV-related risk behavior. We also expect that school-based instruction will increase communication with both parents and peers.

Results

Of the 122 selected schools, 99 (81%) participated in the study, yielding 8,098 usable questionnaires (from 83% of eligible students). Comparisons between all selected schools and those that participated showed minimal nonresponse bias. Participating students were almost evenly distributed by grade and by gender, and ranged in age from 13 to 19. The mean age was 16 years. The racial and ethnic breakdown of the sample was generally representative of U.S. high school students—78% white, 9% black, 8% Hispanic and 5% "other" (i.e., American Indian, Alaskan Native, Asian or Pacific Islander, and unspecified). Almost 54% (95% confidence interval of 48.0–59.5) of the students surveyed indicated that they had received instruction about AIDS or HIV infection in school, and they correctly answered an average of 14.5 knowledge items

Table 1. Percentage of students (and 95% confidence intervals) who reported talking about AIDS and HIV infection with parents or other adult family members and with peers, by selected characteristics, 1989 Secondary School Student Health Risk Survey (N=8,098)

Characteristic	Discussed with parents or adult family member	Discussed with peers
Total	54.4 (51.9–56.8)	59.8 (57.5–62.2)
Age (in yrs.)		
<15	48.4 (43.1–53.7)	46.3 (39.1–53.5)
15–16	54.7 (51.8–57.6)	58.3 (55.9–60.7)
>16	55.2 (52.3–58.0)	64.1 (60.5–67.7)
Grade		
9	51.8 (48.2–55.3)	50.6 (46.9–54.2)
10	53.5 (50.1–56.9)	60.1 (56.9–63.3)
11	56.2 (52.9–59.6)	62.0 (58.6–65.3)
12	55.8 (52.6–59.1)	66.1 (62.4–69.9)
Race/ethnicity		
White	54.1 (51.2–57.1)	59.2 (56.6–61.8)
Black	55.7 (51.0–60.5)	63.7 (59.6–67.8)
Hispanic	54.5 (50.0–59.1)	60.2 (53.8–66.6)
Other†	55.5 (47.5–63.4)	61.6 (54.8–68.4)
Gender		
Female	59.7 (56.5–62.9)	63.8 (60.8–66.8)
Male	49.2 (46.5–52.0)	55.9 (53.3–58.5)
HIV instruction		
Yes	58.8 (56.0–61.7)	64.3 (61.3–67.2)
No	49.2 (45.8–52.5)	54.6 (51.7–57.6)

†Includes American Indians, Alaskan Natives, Asian or Pacific Islanders and persons of other, unspecified backgrounds.

out of 17. Previous analyses of the 1989 data set indicated that HIV knowledge was significantly associated with each risk behavior (that is, as knowledge increased, each risk behavior decreased).²⁹ There was no observed direct effect, however, of receipt of HIV instruction in school on the likelihood of engaging in any of the risk behaviors.

Table 1 shows the percentages of students who discussed HIV and AIDS with their parents and peers, by demographic characteristic and by whether they received HIV instruction in school. While just over 54% had talked with their parents about it, almost 60% had done so with their peers. The demographic profiles were similar among students who reported discussions with parents or other adult family members and those who discussed HIV with their peers. However, except for the youngest students, adolescents in general were more likely to report having communicated about AIDS and HIV with their peers than with their parents or with other adults in the family. In addition, students who received HIV instruction in school were significantly more likely to report communicating with parents and with peers than those who did not receive such instruction.

While 42% of students reported they had never had sex, 24% had had four or more lifetime sex partners, 7% had had three sex partners, 10% two partners and 18% just

Table 2. Unstandardized regression coefficients (and standard errors) showing effects of selected variables on lifetime number of sex partners and on unprotected sexual intercourse, by model for parent or peer communication about HIV

Variable	No. of partners			Unprotected intercourse		
	Parent only	Peer only	Parent/peer†	Parent only	Peer only	Parent/peer†
Parent communication	-.079* (.038)	na	-.157** (.049)	-.096 (.052)	na	-.139* (.056)
Peer communication	na	.170** (.055)	.227*** (.066)	na	.072 (.060)	.125 (.065)
HIV knowledge	-.054*** (.010)	-.061*** (.010)	-.058*** (.010)	-.027* (.010)	-.031** (.011)	-.029** (.011)
Age	.286*** (.026)	.279*** (.027)	.277*** (.027)	.253*** (.021)	.249*** (.021)	.248*** (.022)
Male	.477*** (.052)	.498*** (.051)	.488*** (.051)	.004 (.045)	.024 (.047)	.010 (.046)
Black	.876*** (.094)	.858*** (.094)	.860*** (.093)	.555*** (.083)	.547*** (.081)	.546*** (.082)
Hispanic	-.122 (.072)	-.135 (.070)	-.132 (.071)	.057 (.071)	.052 (.071)	.052 (.072)
Other ethnicity	-.446** (.146)	-.467** (.146)	-.460** (.148)	-.270* (.126)	-.290* (.126)	-.284* (.127)

*p<.05. **p<.01. ***p<.001. †This model considers the simultaneous effects of parent communication and peer communication. Notes: Reference category for race and ethnicity is white. na=not applicable.

one partner. In a measure designed to capture the level of unprotected sexual intercourse, participants were asked how often they used condoms when they had intercourse. Among all students, 20% said they always used a condom, 17% sometimes did so, 8% rarely used one, 14% never did, and as mentioned previously, 42% were sexually nonexperienced. Finally, the vast majority (97%) said they had never injected drugs, while 3% said they had.

The first three columns of Table 2 present the regression results for the effects of each of the three models of communication—parent only, peer only and the combined effects of both—on the students' reported number of sex partners. As the first line of column 1 shows, students who discussed HIV with their parents or with other adult family members were significantly less likely than those who did not to report multiple sex partners (p<.05). However, line 2 of column 2 indicates that students who discussed HIV with their peers were significantly more likely to report multiple sex partners than those who did not (p<.004). The same relationships remained (and were even strengthened) when we simultaneously included both parental and peer communication in the model (column 3): Talks with parents were associated with significantly fewer (p<.003) lifetime sex partners, while talks with peers were associated with significantly more (p=.001) partners.

The data in Table 2 also indicate that in-

troducting controls for parental or peer communication (or both) has little impact on the other associations. Regardless of the type of communication entered in the model, increasing HIV knowledge consistently decreases the likelihood of having multiple sex partners, while this likelihood rises with age. Similarly, male students and black students are more likely than females and whites to have multiple partners, and those of "other" ethnic backgrounds are less likely than whites, no matter how communication was controlled.

When we examined the effects of communication on the likelihood of unprotected sexual intercourse by entering the two types of communication separately into the models, neither had a significant effect, although the direction was the same as that for number of lifetime sex partners (see Table 2). Entering both types of communication into the model again strengthened the relationships: Students who discussed HIV with their parents were significantly less likely to have had unprotected sexual intercourse (p<.02), while those who spoke about HIV with their peers were marginally more likely to have done so (p=.06). Again, regardless of the controls for communication that were introduced, associations between other variables in the models and the likelihood of unprotected intercourse were not affected.

Results from the logistic regression analysis of the effects of communication on the probability of injection drug use,

which are presented as odds ratios in Table 3, are somewhat similar to the previous findings. When we tested parental communication separately, we found a significant negative effect on the likelihood of injection drug use: Students who said they had discussed HIV with an adult family member were 65% as likely as those who had not to have ever injected drugs (p≤.05). When both types of communication were entered into the model, this relationship was strengthened: Students who discussed HIV with their parents were only 59% as likely as those who had not talked about HIV with parents to have injected drugs. However, discussing HIV with one's peers had no significant effect in either model. (Since less than 3% of the sample reported any injection drug use, however, the numbers involved are quite small.)

We next tested the models by subgroup to determine whether the effects of parental and peer communication varied by gender and by race or ethnicity. For ease of presentation, Table 4 indicates only whether the simultaneous effects of parent and peer communication were statistically significant within each full model. However, the direction of the communication effects remained the same when estimated for each subgroup as when estimated for the total sample. The effect of peer communication on the number of sex partners was positive and significant for young men though not for young women; conversely, the effect of parental communication on multiple partners was negative and significant for young women, but not for young men. This suggests that male adolescents are more strongly influenced than female adolescents by talks about HIV with friends, while female adolescents seem more responsive to talks with parents. The effects of communication on this risk behavior differed only partially by the students' race and ethnicity. Both white and black students who had discussed HIV with their parents were significantly less likely than those who did not to have had multiple sex

Table 3. Adjusted odds ratios (and 95% confidence intervals) showing effects of selected variables on the likelihood of injection drug use, by model for parent or peer communication about HIV

Variable	Parent only	Peer only	Parent/peer†
Parent communication	0.65* (0.43–0.97)	na	0.59* (0.38–0.93)
Peer communication	na	1.11 (0.80–1.54)	1.32 (0.91–1.93)
HIV knowledge	0.86*** (0.80–0.92)	0.85*** (0.78–0.92)	0.85*** (0.79–0.92)
Age	0.93 (0.81–1.06)	0.93 (0.81–1.06)	0.91 (0.80–1.05)
Male	1.99** (1.27–3.10)	2.12** (1.34–3.34)	2.01** (1.28–3.15)
Black	0.56 (0.27–1.15)	0.59 (0.30–1.13)	0.55 (0.27–1.13)
Hispanic	0.99 (0.58–1.70)	0.96 (0.55–1.68)	1.00 (0.59–1.69)
Other ethnicity	0.51 (0.13–1.94)	0.50 (0.13–1.89)	0.50 (0.13–1.90)

*p<.05. **p<.01. ***p<.001. †This model considers the simultaneous effects of parent communication and peer communication.

partners, while white and black students who had discussed HIV with friends were significantly more likely. Among Hispanics, however, neither discussions with parents nor talks with friends were associated with the number of partners.

When we tested for the impact on unprotected sexual intercourse, we found that the effects of HIV discussions also differed by gender, with peer communication being positive and significant for males but not for females, and parental communication being negative and significant for females but not for males. The only communication effect that was significant in one of the race and ethnic groups was that of parental communication among black adolescents, which significantly decreased their probability of engaging in unprotected intercourse.

Similarly, the effects of parental and peer communication on the probability of injection drug use also differed by gender. Among young men, the negative effects of parental communication and the positive effects of talks with friends were both significant. Neither type of communication, however, significantly influenced female adolescents' likelihood of injecting drugs. (The number of young women, however, who said that they ever injected drugs was very small, and there were too few adolescents within each of the racial and ethnic subgroups to permit analysis.)

Because schools have incorporated HIV instruction into their curriculum as one way of reducing the spread of AIDS, we analyzed the effects of such instruction on the likelihood that adolescents would discuss the subject with parents and peers. The analysis controlled for HIV knowledge and for demographic characteristics. As the odds ratios displayed in Table 5 show, HIV instruction significantly increased (by more than 40%) the likelihood that adolescents would discuss HIV both with their parents and with their peers.

Discussion and Conclusions

We found that both types of communication—with parents or with peers—significantly affect risk behavior, but in opposite directions. Discussions about HIV with parents tend to decrease the likelihood that adolescents will engage in risky behavior, while communication with peers tends to increase that likelihood. Unlike previous research, our study examined both parental and peer communication, and we were able to control for confounding effects between the two. Not only did the opposite effects remain after both types of communication were en-

tered into the model, but the effect of each was strengthened. This finding results from the fact that parental and peer communication are positively correlated ($r=.36, p<.001$), so omitting one from the analysis weakens the effect of the factor that is retained. The lack of an effect or inconsistent effects in earlier communication studies may have resulted from not being able to analyze both communication measures simultaneously.

The analyses by gender suggest that male adolescents are more influenced by discussions with peers, while female adolescents are more affected by discussions with parents. The analyses by race and ethnicity suggest that white and black students are influenced equally by the two types of communication. Hispanic students, however, reacted differently, since we found that neither type of communication significantly affected their HIV risk behavior. If these differential effects are found to be consistent in other analyses, they could provide insight into understanding more precisely the conditions under which patterns of communication affect risky behavior.

Our study was also unique in that we were able to investigate the role of HIV instruction in the relationship between communication and HIV risk behavior. Although an analysis of the same data set revealed that school-based HIV instruction did not directly affect related risk behavior,³⁰ our findings suggest that such instruction indirectly influences risk behavior through its effects on communication, since it increased the likelihood that students would discuss HIV, both with their parents and with their peers. However, since each type of communication had the opposite effect, this counterbalancing may explain why school-based HIV instruction has not consistently and significantly affected the likelihood that students would engage in these behaviors.

The impact of HIV instruction on the likeli-

Table 4. Significance of effects of HIV communication with parents and with peers on the likelihood of HIV risk behavior, by gender and race or ethnicity

Characteristic	Multiple partners		Unprotected intercourse		Injection drug use	
	Parent	Peer	Parent	Peer	Parent	Peer
Gender						
Male	ns	≤.05	ns	≤.05	≤.05	≤.05
Female	≤.05	ns	≤.05	ns	ns	ns
Race/ethnicity						
White	≤.05	≤.05	ns	ns	u	u
Black	≤.05	≤.05	≤.05	ns	u	u
Hispanic	ns	ns	ns	ns	u	u

* $p<.05$. Notes: Parental and peer communication are included together in each model. ns=not significant; u=unavailable, because there were too few cases to analyze the likelihood of injection drug use by racial and ethnic subgroups.

hood that students will actually discuss HIV suggests that the effectiveness of such programs will depend on how they are structured, a finding that has both programmatic and policy implications. First, since talking about HIV with parents decreased the likelihood of adolescent risk behavior, educational efforts that specifically encourage parent-adolescent discussions and include parents in the development of these efforts could potentially have an even greater impact. Research has already shown that an educational program for parents can significantly increase the level of parent-child communication about sex.³¹ Our analysis suggests that school-based HIV instruction can also increase parent-child communication, a finding supported by earlier national data on the impact of formal sex education.³²

Second, although peer communication increased the likelihood that students would report engaging in HIV risk behavior, such an effect in itself suggests a potential avenue for changing behavior: Schools might develop instruction that fosters positive peer norms to ensure that peer communication reinforces rather than detracts from risk-reduction messages. Two studies, for example, have shown that peers can be influential in promoting condom use among adolescents,³³ which sug-

Table 5. Adjusted odds ratios (and 95% confidence intervals) showing effects of selected HIV knowledge and demographic variables on the likelihood of parental or peer discussions about HIV

Variable	Parental communication	Peer communication
HIV instruction	1.42*** (1.23–1.64)	1.43*** (1.25–1.63)
HIV knowledge	1.06*** (1.03–1.09)	1.10*** (1.06–1.13)
Age	1.06** (1.01–1.11)	1.21*** (1.14–1.27)
Male	0.65*** (0.57–0.75)	0.71*** (0.63–0.80)
Black	1.11 (0.88–1.39)	1.30* (1.05–1.62)
Hispanic	1.06 (0.87–1.29)	1.13 (0.88–1.46)
Other ethnicity	1.17 (0.84–1.63)	1.27 (0.94–1.71)

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

gests that school-based HIV instruction could incorporate the effects of peer communication to reduce risk behaviors.

Our study has four limitations that should be mentioned. First, our data are cross-sectional, and thus we cannot determine if communication preceded or followed the reported risk behavior; longitudinal or retrospective studies will be needed to specify the timing of parental or peer communication. Furthermore, parental and peer communication may differ not only in terms of when they usually take place, but in when they are relevant to the adolescent.

Second, since drop-out rates increase with grade level, this school survey is necessarily less representative of the general population at the higher grade levels, and many of the characteristics we measured are likely to differ among adolescents who are no longer in school.³⁴ Understanding patterns of parent and peer communication among these out-of-school adolescents and their effects would require another kind of study.

Third, because the data were self-reported, underreporting or overreporting may have occurred. However, to increase the probability that students would report their experiences accurately, extensive efforts were made to ensure privacy and anonymity. We also note that the prevalence of the risk behavior reported in this survey is similar to that found in other surveys of U.S. adolescents.³⁵

Finally, we did not have information about the quality of the parent-student communication about HIV, or information from the parent or other adult on that communication. While previous studies have found differences in outcomes depending on who is supplying the information, some researchers have argued that adolescents' recollections are more relevant than those of their parents, since the adolescent's perception of the communication is the most meaningful to his or her behavior.³⁶ With respect to the quality of the communication, some have argued that the nature of the discussion may not be as important as the fact that it occurred at all, since communication itself may be indicative of parental involvement or support. In fact, one researcher found that even limited or indirect discussion between parents and their adolescents resulted in more responsible adolescent contraceptive behavior than did no discussion at all.³⁷

Although the incidence of AIDS among adolescents is still low compared to that among other age-groups, the prevalence of HIV risk behaviors and the presence of HIV infection among adolescent popula-

tions underscore the need to maintain and increase prevention efforts in this group.³⁸ Our analysis suggests that parental and peer communication have opposing effects on behavior that increases the risk of HIV infection. However, school-based HIV instruction appears to increase the likelihood that both types of communication take place. This indirect effect of instruction suggests that school-based education might be restructured to strengthen communication with parents and counter the negative influence of peer communication on risk behavior.

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